Can't Outguess Congress

• The Farm Relief Bill, now before the Senate, affects practically every manufacturer of food in various ways, aside from the monetary riders that are being considered. We had hoped that in May FOOD INDUSTRIES could present a detailed interpretation of how the new law will actually be administered. But after spending four days in Washington we decided we could not outguess Congress. And so it will be postponed until June (provided it is enacted by that time).

• With things popping in every direction as they are today, it is a very courageous person who will attempt to say just what he will do 30 days hence. All we can do now is say that we hope our plans for June will include most of the following subjects:

IN JUNE

"Interpreting Farm Relief"

"How Manufacturers Think the 30-Hour Labor Law Will Affect Their Costs"

"Starch Drying, as applied to Casting Starch"

"Rat Control"

"Bread Cooling"

"Banana Products"

"Purchasing Fuels on a Cost Basis"

"Irradiating Yeast to Stimulate Its Leavening Effect"

"How Quality of Raw Materials Affects Beverages"

• How did you like the cold April we experienced? See the chart of Solar Radiation for explanation.

THE EDITORS.

FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

LAURENCE V. BURTON, *Editor*

M. A. WILLIAMSON, *Publishing Director*

Contents for May, 1933

VOLUME 5 NUMBER 5

"A Peach Crop Must Be Saved!" It Was—But What to Do With It? 163
BY C. C. STREET

Vacuum Fumigation Protects Candy Bars From Insect Damage 166
BY GEORGE WILLIAMSON

Using Fresh Strawberries in Cordial and Cream Candies ... 168
BY W. F. ROBERTSON

Alcoholized Gasoline for Farm Relief 169
BY R. S. McBRIDE

When the Screw Cap Sticks, How Does a Woman Open the Container? 170
BY M. L. CARR

Possibilities and Limitations in Canning Orange Juice 172
BY M. A. JOSLYN AND C. L. MARSH

Recirculation Process Lowers Cost of Vinegar Production 174
BY A. L. NUGEY

Quick-Freezing Destroys Parasites of Trichinous Pork 177
BY DONALD K. TRESSLER

Dust Explosions—How to Minimize Their Destructive Force by Proper Use of Vents 178

Reducing Tire Expenses by Proper Control and Maintenance Methods 180

Operating Motor Trucks in the Food Industries 184

Editorials	161	**Business Trends**	194
New Books	185	**Current Literature**	196
New Products	186	**Patents**	197
News	188	**New Equipment**	198
Men, Jobs and Companies	192	**Manufacturers' Catalogs**	199
		New Construction	200

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FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

Volume 5.....Established 1928—McGraw-Hill Publishing Company, Inc.....Number 5

NEW YORK, MAY, 1933

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Laurence V. Burton, Editor

Turning to the Left

BETWEEN the Perkins 30-hour bill and the farm relief bill with its latest amendment, America finds itself in a bewildering conflict of emotional, political, financial and economic forces. How much time will be permitted to industry to think its way through the maze of ramifications and implications attendant upon these legislative measures is impossible to know. It appears, however, that by the time these words reach our readers, the farm relief bill may have become law, despite the protests of the economically better informed.

● THERE remains, however, the Perkins bill, which, in our opinion, possesses greater potentialities than anything seriously proposed by any administration in this country. The point of view which employers will take will depend to a large degree upon their philosophical reflections during the last decade. Obviously the bill in its first draft was hastily drawn and contains many features that must be revised before it can ever be passed and signed. But the conclusion is inescapable that the administration is being forced by public opinion to make the "new deal" a reality.

● SURELY, but not very slowly, we are embarking on a career of socialized industry—perhaps even state socialism. By the Perkins bill, industry apparently is to be forced into production control—to do the very things that have long been prohibited by the anti-trust laws. Was there ever so abrupt an about-face?

● POLITICAL skeptics regard the Perkins bill as a trial balloon. However, those who are in closest contact with the administration maintain that the measure is a necessary concomitant to the inflationary amendment to the farm relief bill; that it is set up as a brake which can be utilized to stop inflation at whatever point the judgment of Washington shall dictate.

● IF THE LATTER purpose is the true one, and if the bill will be rewritten and amended to limit its scope of application, and its life or duration to not more than two years, it may not be so wholly bad for industry as it appears in its first draft. Section III in particular needs detailed study by every manufacturer, for it is here that the government is empowered to regulate production. It reads: "If it shall be found by the Secretary of Labor . . . that the operation of any plant or plants . . . is disturbing and preventing a fair balance of production in the industry involved and is bringing about overproduction or unfair competition in interstate commerce by reason of excessively long periods of operation and thereby causing extraordinary hardships to other plants . . . in said industry, with consequent substantial injury to the general welfare . . . the Secretary of Labor . . . shall specify a limitation upon the total hours of operation of said plant or plants . . . to bring about a more equitable adjustment of production within said industry."

● IF IT ACTUALLY contemplates a long-time period of social control of industry, the readjustments that will be required will be very far-reaching. Although it is still too soon to foretell its effect, because of the necessity for revision of the first draft of the bill, it is not too early to point out the obvious. Under any 30-hour limitations of labor, many a manufacturer will be forced to undo years of welfare and constructive employee-relationship work, and to curtail the productive capacity of his plant to permit the operation of a less favorably located plant so that other people may be employed to the detriment of those who are now barely making a living wage. To illustrate: For nearly twenty years one large food company has maintained a guarantee of a minimum of 40 hours of labor to every employee. Also it has paid all its help on the basis of a well-known wage-incentive system. Under the first Perkins bill, the 40-hour guarantee would automatically be thrown overboard and the company be forced to discard the wage incentive plan.

● PROBABLY, however, we shall be faced with the problem of adjusting ourselves to the effects of currency or credit inflation and processing taxes before we shall be compelled to cope with the more difficult management problems arising from the 30-hour labor law. Both measures call for resourcefulness, caution and sound judgment, and may require a choice between interstate and intrastate business.

● BUT there is a still larger viewpoint of the mêlée in which we, as well as the rest of the world, find ourselves. Our own reaction, like that of most responsible employers, is to resist the changes that are being imposed upon us by forces greater than ourselves. Yet each must realize that these may perhaps be a part of the vast irresistible social forces that have brought about the amazing revolutions that appear on every side today. A principle on which we may rightly decide our future course—whether we shall embrace or oppose social control of industry—is, not whether we are justified in defending our own selfish rights but whether the proposed program is one of good or evil for the majority.

...AS IT LOOKS TO US

Truth in Advertising

If the same speed is applied to the amending of the Food and Drug Act of 1906 that has been found with most recent legislation, it is probable that the federal food laws will soon be greatly increased in scope and penalties. We believe that the proposal to include advertising as well as labels within purview of the Department of Agriculture is a good measure and deserves the support of all honest food manufacturers. True, it will make it harder to find an idea on which to hang a sales campaign, but it also precludes a competitor from indulging in some very objectionable or unwarranted claims in his advertising copy. At present it is planned to make only the vendor liable for false statements, and, furthermore, it will not be necessary to prove injury to a competitor to establish a violation. It's a constructive move; we are for it; but it needs study. *Better production and quality control* in the factory must follow if it is enacted.

•

Impossible

Canners and fisheries face the serious problem of securing exemption from the 30-hour labor limitations of the Perkins bill. Most canneries operate only a few weeks in a year and are located in communities where there is not enough local help available for two, three, or four shifts; nor is there housing available for the huge crowd that would be temporarily needed. Fishing vessels have not space for a four-shift crew, and salmon packers in Alaska do not have enough ships available to transport all the help that is required under the bill. It is strange but true that there is no local labor on the shores of the Bering Sea.

•

Prices

Commodity prices are rising, yet in making forward commitments we counsel caution. Most raw materials for food manufacture exist in superabundant supply, and, while it may be possible to make a speculative profit, we see no need to incur the risk of speculative losses as long as ample supplies are in sight. Hedging operations are preferable wherever possible until there exists a demonstrable increase in consumption rather than speculative demand, or until surpluses decrease to more normal levels.

•

Mystery Explained

One of the complaints superintendents sometimes make is that automatic weighing and packaging machinery never comes to the factory fully adjusted to the product to be used; that considerable study and supervision is required after delivery before the machine operates smoothly and accurately. We have looked into this problem and find that the trouble lies chiefly with the product; not the machine.

In your own plant, the machines operate always on new material, but at the machinery maker's plant all they have is a hundred pounds or so of your materials. Assume that it is a free-flowing solid like tea, peanuts, tapioca, salt, coffee, or baking powder, then imagine what this solid will be like after it is run through the machine for a few hundred times. Corners have been worn off the product. Rough particles will have become smooth; almost slippery.

The machine must perforce be adjusted to this many times repackaged product while at the maker's plant. But is this identically the same material that it will handle when you get it? Common sense tells us no, for one trip through a weigher or filler does not wear a product smooth. Hence it is impossible to adjust the machine to fresh products unless it is constantly handling fresh product.

•

Housekeeping

An important step in the production of quality foods is good plant housekeeping. All advantage gained by use of high-quality raw materials and up-to-date equipment is lost if your plant is not properly ventilated to prevent development or accumulation of odors which will be absorbed by the finished product and result in loss of consumer goodwill.

Dusty, dirty stairways (yes, even back stairways and fire escapes) not only give the plant visitor an unfavorable impression but encourage carelessness and loss of morale on the part of employees, and in the case of highly perishable products may result in destructive mold or bacterial infection of the finished product.

Stray nails, bits of wire, bolts, screws, pieces of string, cloth or paper, if allowed to lie around haphazard, have a way of getting into the finished products and ultimately to the consumer. Sometimes these stray articles are the basis of damage suits, which, if successfully pressed, wipe out the profits resulting from several months of hard work and careful planning. Good housekeeping is first-hand evidence of good management.

•

Economies

When searching for ways to save money do not overlook the economics of group drives vs. individual motor drives. Substantial power-cost savings may often be found by using the group drive when the production rate is slow. Penalty charges paid to a power company do not produce goods, nor do they pay utility dividends. Penalty charges are pure waste.

•

Late Spring

Monthly solar radiation figures are a regular feature of the Business Trends department of each issue. Here is a fundamental force in agricultural and economic affairs which is capable of long-range forecasting. Although it is too soon to interpret its real significance to all food manufacturers, we suggest that you consider the coincidence of the lateness of this spring and the declining solar heat.

•

Big Laugh

"In a recent article in FOOD INDUSTRIES, 'How Strong Is a Woman?' the Pittsburg Testing Laboratory took a back-handed slap at the faithful old screw cap. But the O-Cedar Wax Cream package, in spite of the handicap of a screw closure, won the Wolf Award and the All-American Twelve Cup. Convenience was a *most important* consideration in both contests. Katherine Fisher, of Good Housekeeping Institute, who should be a pretty good authority on *how strong is a woman,* served on both committees of award. Bet old John L. Mason, who invented the screw cap some seventy-odd years ago, had a big laugh out of all this."—Comment by Hig, in May *The Phoenix Flame.*

"A Peach Crop Must Be Saved!" It Was—But What to Do With It?

By C. C. STREET
Atlanta, Ga.

● **A new method of food processing, an abundance of raw material and technical talent, a fortune in working capital, and unbounded enthusiasm fanned to greater intensity by pride in achievement and faith in future profits comprised the prospectus upon which the first commercial freezing of peaches was rushed into productive operation. Not until an attempt was made to market the finished product did the promoters of this enterprise come down to earth and realize that successful production is only one phase in the profitable manufacture of food. In less conspicuous manner other food manufacturers have had to face market realities for their products. Many have been smart enough to do so before starting quantity production.**

THE FIRST commercial freezing of peaches was a huge success from the standpoint of spending money. A veritable "boom" had been started. Had not the new discoveries in quick-freezing been an instrument of the Almighty, placed in the hands of man, to save the highly perishable peach crop? And it was *perishing,* too. Wasn't it man's duty to build factories and equip them with the latest mechanical devices so the peach crop could be saved? Were there any arguments against the philanthropic undertaking? No! No! All the arguments were "pro." Any "con" arguments in this proposal were being offered by persons who were immediately placed in the category of pessimistic "hard-heads" who could always be expected to offer the advice "it can't be done." No one wanted this advice. Who was asking for "con" advice, anyway? The job could be done, and it must be started immediately. It was man-power that was needed; men who could get things done.

Advice had been given by government experiment stations that successful freezing of peaches, under quick-freezing methods, had not yet been accomplished. Information revealed that certain experiments had proved successful, while others were disappointing; that sufficient work had not been done from which determinations and recommendations could be made regarding the more important items to be considered. Little was known about the size and shape of cartons best suited for packing; proper temperatures to use in freezing; length of freezing time; varieties of peaches (if any) best adapted to freezing; proper storage temperatures required; and a number of other salient factors which would, of necessity, be encountered in any commercial production of frozen peaches.

But was advice of this nature wanted? Not at all. Those problems would be worked out as they were encountered. Employ sales engineers to make a survey of marketing conditions and potential demands? No! These sales engineers might produce "con" arguments.

The quick-freezing method of food preservation had been discovered and was now being launched successfully in other lines of food packing. If these could be quick-frozen successfully, then surely the peach could be handled similarly and much easier, because peaches have about 35 per cent less total solids than fish. Water, the remaining substance, would be easy to freeze.

Through this line of reasoning a vast industry "sprouted" overnight in the beautiful fruit belt line only a few hundred miles south of the famous Georgia peach section. Plans began to crystallize in June, 1930. Factory sites were located and construction work was started immediately without waiting for the completion of building plans. An emergency was at hand. The early variety of peaches were already reaching maturity. No costs were to be spared.

Under high-pressure supervision the buildings were erected as if by magic. Ambition and energy were at a fever heat. The future never looked brighter for the peach-growing industry. Overproduction and short harvest periods, with consequent market gluts and price declines, had handicapped profitable expansion.

Presumably, the people throughout the nation would not have to make such a large meal of fresh peaches as they had been accustomed to doing. Instead of having the usual six weeks in which to satisfy the appetite for fresh peaches, one would be able to nibble along on them throughout the year. Just 'phone the grocery store and a carton of fresh peaches would be delivered immediately, whether the month be June or December. The craving for delicacies, during a period when they were not obtainable, could be satisfied. There would be no overproduction of peaches. Peach growers would have new hopes. Employment would be furnished for thousands of people in this new enterprise. The originators would be able to glory in their accomplishment. Financial investment would reap its profits, and the "stiff-necked" influences of all "con" arguments would be killed.

The spectacular undertaking was producing wild enthusiasm. The atmosphere was impregnated with energy. Men were working in a frenzy. Unheard-of schedules were maintained. Proper engineering principles were sacrified for "speed." Machinery was received by express and installed overnight. Supplies came in by the carload. Salesmen, engineers and ex-experts came in from far-away places to assist in the installation and operation of machinery. Money rapidly changed hands. Men perspired. *A peach crop must be saved.*

Huge compressors soon started to function and an Arctic sub-zero temperature was available in the freezing chambers. Peaches, fresh from the orchards, began to arrive. Growers were rejoicing—a cash market was at hand. Production started. The product was beautiful and every ambition seemed to be fulfilled. No effort was spared to push manufacturing operations to the limit. Man-power and machinery were strained beyond their capacities. Money continued to flow.

These activities continued rampant until the last available peach was neatly peeled, sliced, packed in its container

Factory buildings were rushed to completion under high-pressure supervision.

and placed in low-temperature chambers to freeze. *A peach crop had been saved.* The new product had been definitely established.

In all sincerity the quality of this production and the deliciousness of the finished product were supreme. The product represented not only the first step in commercial peach freezing but it was the last word in quality merchandise. This fact will serve to testify to the steadfast nature and "go-getiveness" of those who fostered and promoted the project. Their labors were worthy of greater reward, and their aggressiveness was worthy of greater profit than has yet been derived from the undertaking.

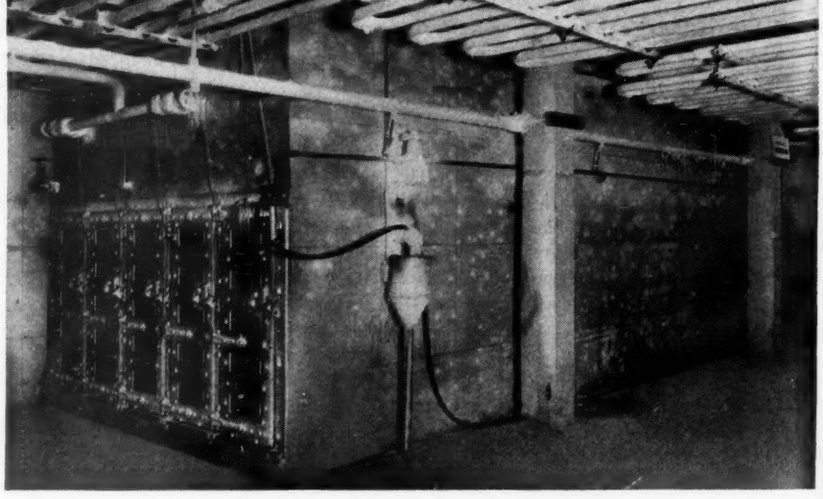
Having no conception of the disillusionment and distractions which were to follow such heroic attainment, the march went on. Selling plans were mapped out—rather extravagant and big. It was felt that a high-class product, such as these peaches, must be handled in a manner commensurate with its bigness. Introductory work and special advertising were impressive but not very responsive. Distribution problems were encountered with no small measure of perplexity. The psychological emotions of early activities had not completely vanished, however, and no problem seemed insurmountable.

But, alas! Money continued to disappear and profits were not yet in sight. Several fortunes had been invested, but still more money was needed to sell the stocks of peaches and place the product within reach of the buying public. This huge investment must be returned to its original source—with a profit, if possible. But it took more money to get this money back. The peaches must be sold, and profits must be realized. Now the economics of this vast undertaking were becoming noticeable. Some of the original "con" arguments were being experienced.

The merchandising task did not hold the romance and glamor that characterized the headlong plunge into production. Cold facts, complex problems—not theories—must be dealt with. What manner or means would produce the quickest results? How could huge stocks of frozen peaches be sold and distributed in an economical manner? No one knew how long the warehouse stocks could remain in a perfect state of preservation or what temperatures were required to give them the proper refrigeration.

The peaches must reach ultimate consumption. People must be educated to eat frozen peaches; must be taught how to serve them. This all necessitated further spending of money. No one knew whether the buying public wanted their frozen peaches in quarter-pound cups or one-pound buckets—or whether they wanted them at all. No one knew whether frozen peaches would be consumed for breakfast or as an evening dessert; whether they would be delivered by milkmen on their early morning routes or sold from vending wagons that frequent residential neighborhoods in the evening. No information was available which would tend to show whether frozen peaches should be sold during the cold-weather months or whether it would be advisable to suspend all sales efforts until the return of warm weather. It was problematic whether people would demand frozen peaches during the warm months when so much fresh fruit of all kinds was available.

The fur merchant knows there is more demand for fur coats in cold than in warm climates. Most anyone knows the folly of trying to sell snowballs to the Eskimos. Not even this much information was available in regard to selling frozen peaches prior to the autumn of 1930. Frozen peaches might sell better in Atlanta than Halifax; who knew? One guess was as good as another. No test sales had been made, and no market surveys were available upon which conclusions could be based in formulating a definite plan of



Tunnels, equipped with gravity conveyors, were built to freeze 40,000 lb. of sliced peaches in 24 hours.

sales and distribution. *Yet the frozen peaches must be sold.* This accomplishment was vastly more important than the problem represented by the slogan "a peach crop must be saved."

All manner of sales and distribution methods were tried. The same fundamental problem of distribution was always encountered: What economical and adequate means could be employed to supply refrigeration for the product after removal from cold-storage warehouses? This involved refrigeration for deliveries, retail sales outlets and the home.

It was found that adequate low-temperature facilities did not exist in many retail stores. Also it proved to be the most difficult task to find enough suitable retail outlets in a given center of population to handle a car-lot shipment of frozen peaches, and it was entirely impractical to ship in less than carload lots. An abundance of ice and salt would refrigerate car-lot shipments, but that method of refrigeration was not practical with smaller shipments, and other means of refrigeration were too expensive.

Consequently, to get economical dis-

tribution of frozen peaches, it was necessary either to supply retailers with low-temperature cabinets or to encourage them to purchase equipment themselves. Each of these methods involved peculiar problems. How could low-temperature cabinets be supplied without involving a staggering investment? Would too much time be lost in trying to persuade the retailer to purchase his own equipment? Would it be economical to operate these cabinets for the exclusive handling of frozen peaches?

The answer to the last question was not in the affirmative, as one can well imagine. The answers to the first and second questions have not yet been fully determined. However, as demands increase and the initial cost of low-temperature treatment is correspondingly decreased, these problems will automatically adjust themselves. They presented a very perplexing situation in 1930 and 1931 with large stocks of frozen peaches yet unsold.

During the winter months it was not necessary to use an artificial refrigerant to any extent while the peaches were being transported in trucks. However, the approaching warm weather emphasized the need for this refrigeration in seemingly unlimited quantities. Solid CO_2 was used. It was ideal in that it leaves no moisture and imparts no contamination; but it costs money. Especially when several tons has to be used weekly.

To overcome these problems and still show a profit presented a perplexing task. By this time it was fully realized that the economical production and distribution of frozen peaches possessed many ramifications.

This does not imply that frozen peaches represent an impractical product, or that the product cannot be merchandised successfully and economically. On the contrary, frozen peaches represent a delicious food item, an entirely practical product, and a profitable piece of merchandise with distinct advantages of unlimited sales possibilities.

These facts were clearly recognized, despite financial adversities in the initial production and distribution of frozen peaches. A wealth of experience was gained, many problems were solved, and an abundant knowledge was collected which will be priceless in future activities. However, the experience was gained at a high cost and at a terrific sacrifice. It is the only reward for the bitter experience and is, therefore, valued highly.

A semi-commercial testing laboratory in which all manner of production experiments could be conducted and carefully recorded would have saved a large sum of money and considerable lost motion in the first commercial activities. And the lower resulting prices would have removed one sales handicap.

Even with high production costs no losses would have been suffered had no further abnormal burdens been encountered. Frozen peaches appealed to the luxury-loving palate and could command a handsome price, but the terrific expense of opening sales outlets and developing the necessary facilities for distribution could not be charged against the already overburdened sales price and have the product welcomed by a market to which the product was new.

Furthermore, whether an undertaking results in failure or success, there remains the fact that men have toiled and ideas have been expressed in action. Something has been accomplished. This is exemplified in the first commercial production is frozen peaches. No tangible profits were recorded, but ideas were developed and experience was gained which will be of material help to those who will engage in the production of frozen peaches long after the débâcle of 1930 has been forgotten.

Production had been unusually successful but sales results were a disheartening failure. If the fundamentals of success had not been predicated upon profit and if it had not been necessary to recover all production and distribution expenditures with a fair margin of profit, then it could have been said that the sales results were successful. As it was, it became apparent that the economical solution to all the distribution problems and answers to all sales inquiries could be found only through careful development work and marketing tests.

The entire output was finally sold, but it proved to be a herculean task. Many thousands of people became acquainted with frozen peaches. However, desperately at the end, the last remaining stocks were thrown on the market at bargain prices. Accumulated storage charges were liquidated by relinquishing the merchandise to warehouses. Subsequently, these stocks were sold as distressed offerings. A monumental loss was recorded—and charged to experience.

Credulous aspirations had been disillusioned and broken, but through these perplexities and bewilderments came a more complete understanding of economics. If the economics in connection with this undertaking had been more carefully observed, there would have been no heavy financial losses, because it is quite likely the production of frozen peaches would not have been so great.

Production activities called for a large quantity of human labor to get the peaches peeled, sliced and packed in containers ready for freezing.

When the last peach had been "saved," quiet and solitude replaced production excitement. Then began the desperate effort to find a market for the peaches.

Vacuum Fumigation Protects Candy Bars From Insect Damage

By GEORGE WILLIAMSON
President, Williamson Candy Co.
Chicago, Ill.

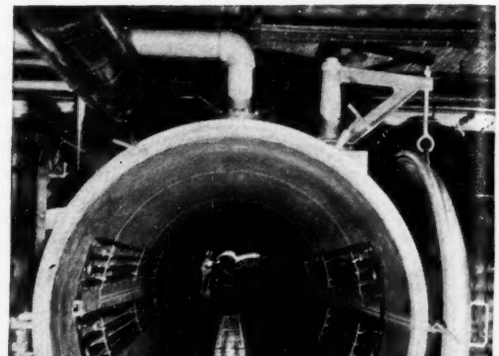


Fig. 1—The 1924-cu.ft. capacity of the processing tank permits a car of peanuts, 250 bags, to be processed at one time. The entrance end of the tank opens into the receiving room.

EVERY candy manufacturer who uses nuts, cocoa beans or other infestible materials faces a drain on his business directly due to losses caused by insects. His is the same serious problem that has confronted manufacturers in other branches of the food industry and has been responsible for much research on the subject of fumigants and the development of various methods of treating foods susceptible to insect infestation. In his case the annual traceable loss due to insect damage approximates 1½ per cent of his gross sales.

Almost any confectionery manufacturer would count himself fortunate if this represented his total loss. Unfortunately, insect infestation is the cause of losses at three distinct points in his business: at the warehouse or factory, at the distributor and at the consumer.

The first is the loss caused by damage to raw materials stored in warehouses or at the manufacturer's own factory. This loss is direct and can be determined by the individual manufacturer. The second is the loss resulting from goods returned on account of insects or worms discovered in the finished product on jobbers' or dealers' shelves. This loss also can be determined by the manufacturer. The third is a loss that cannot be calculated, although from an economic standpoint it is likely to be greater than the combined losses from the other two sources.

The loss at the third point is the result of the alienation of consumer goodwill by defective, wormy candy. Too generally it happens that if a person finds a worm in the piece of candy which he is eating he is through with that brand of candy—perhaps all candy of that type—for life. And, what is more, this disgruntled consumer passes the word along to his friends and acquaintances and may be the cause of further loss in consumer goodwill and profitable sales. It is this intangible loss that concerns the candy manufacturer most.

In the manufacture of Williamson Candy Co. products, including the three nationally known bars, "Oh Henry!," "Rosio" and "Amos 'n Andy," our constant aim has been to make them the best possible. We have never had a desire to dodge the problem of insect infestation. Instead we have always faced it squarely and now believe that we have solved it.

One of the practices in which we have prided ourselves most is our careful selection of raw material. Everything going into the manufacture of our products is subjected to rigid inspection before acceptance. Despite all our precautions along these lines, however, we were for years unable to prevent the development of insects in materials that apparently were free from infestation when we received them.

To understand how this can happen it is necessary to know something of the life history of insects that infest nuts, cocoa beans and similar raw materials; where they come from; and how they gain access to the materials in which they are found. There are several varieties of insects that commonly infest the materials that go into the manufacture of candy. But whether the adult insect be a flying moth or a crawling weevil, the life history of each is quite similar.

Let us take the Indian meal moth, commonly found in candy plants, as an example. The adult is a moth with a wing spread of about ¾ in. The female lays about 350 small eggs that are almost microscopic in size. The length of time required for these eggs to hatch depends upon the temperature and humidity of the surrounding air. Under favorable conditions they may hatch within a few days or they may lie dormant for a long period. From the egg comes the larva—a worm, which when full grown is nearly half an inch long and of a white to flesh color. It is these worms that create the havoc. Their appetites are almost insatiable, and during the larval state, which may last several weeks, the insect consumes many times its own weight in food. The full-grown larva finally spins a silken cocoon in which the insect transforms itself into a reddish brown pupa. After a variable period, also dependent on temperature and humidity, the adult moth emerges from the cocoon, ready to lay more eggs and thus complete the life cycle.

It is easy enough by inspection of an incoming shipment of raw materials, such as nuts, to determine the presence of adult insects, pupæ or larvæ, but the tiny eggs, which may be imbedded within the nut meat, defy such inspection as can be made on a commercial basis. As a matter of fact, it is a natural thing for insect eggs to be present in otherwise sound nut meats and for the initial infestation to occur before the nut or cocoa bean is in the candy manufacturer's plant.

In an attempt to keep our plant free from these insects we have used plant

fumigation regularly. This has proved successful for killing the adults, the pupæ and the larvæ, but is of little value for killing the eggs. Unless all eggs are completely devitalized they will rapidly hatch as soon as they are subjected to a favorable temperature, and then the life cycle again starts merrily on its way.

The same holds true for the cold-storage method, which we have employed to help cut down our losses. Cold storage serves merely to reduce insect activity. It does not eliminate it, and the infestation continues as soon as the temperature is raised to the proper point.

We have also tried the fumigation of incoming materials as received in the cars at our doors. This method also failed to affect the eggs, due to their high resistance to any outside agency and on account of it being impossible to confine the fumigant for any length of time in an ordinary freight car, which is, of course, far from airtight.

We next studied the possibility of treating incoming materials in gas-tight rooms or chambers by means of powerful gases. We decided against the use of some of them on account of their deadly toxicity to human beings. Others were out of the question because of their fire and explosion hazards and the ordinances restricting their use, as well as for the reason that they effected changes in the food value and taste of the nuts.

About this time the U. S. Department of Agriculture developed a new gas which it named ethylene oxide. This gas, mixed with carbon dioxide[1], we understood, was proving effective in the processing of many varieties of foodstuffs, including nuts, as well as tobacco and tobacco products. We investigated the possibility of the use of this gas in a gas-tight chamber under atmospheric conditions and found that while it apparently was effective, from 12 to 24 hours' exposure to the gas was required to obtain anything like a complete kill. We did not want to slow up our production to this extent.

We then had our attention called to the Guardite process, which is the commercial application of the ethylene oxide-carbon dioxide compound known as Guardite gas. As the Griswold, Walker, Bateman Co., of Chicago[2]—a public warehouse concern—has an installation of Guardite equipment for the customs processing of foodstuffs and tobacco, we decided to make an exhaustive test on a real commercial basis.

The Griswold, Walker, Bateman Co. processed more than twenty-five carloads of nuts for us during the period of this test. A careful record was kept of the processed nuts and of the candy bars in which these nuts were used. At the completion of the test we found that no infestation had developed in the processed nuts and that we did not have a single bar returned on account of infestation. After years of discouraging attempts to free our products from possible insect infestation, we had at last met with success. We could then truthfully say that infestation was no longer a menace to "Oh Henry!" and to our other candy bars.

Our next step was to install Guardite equipment in our own plant for processing all our own chocolate and nut meats. In this unit the processing tank is a cylindrical steel vessel 7 ft. in diameter and 50 ft. long, closed at each end by a steel door that swings on a ball-bearing crane. It will accommodate a carload of nuts at one processing.

At one end, which is called the "entrance," the unit opens into a small room in which incoming bags of nuts and similar materials are received directly from the cars by means of a chute. The bags are loaded on factory skids and are run onto a steel flooring in the processing tank. The tank extends through the wall which partitions this receiving room from the storage room. The main portion of the tank is in the storage room. The partitioning wall is tightly sealed around the tank and the only direct communication between the receiving room and the storage room is a steel firedoor through which no material of any kind is permitted to pass. Consequently no incoming material reaches the storage room until after it has been processed.

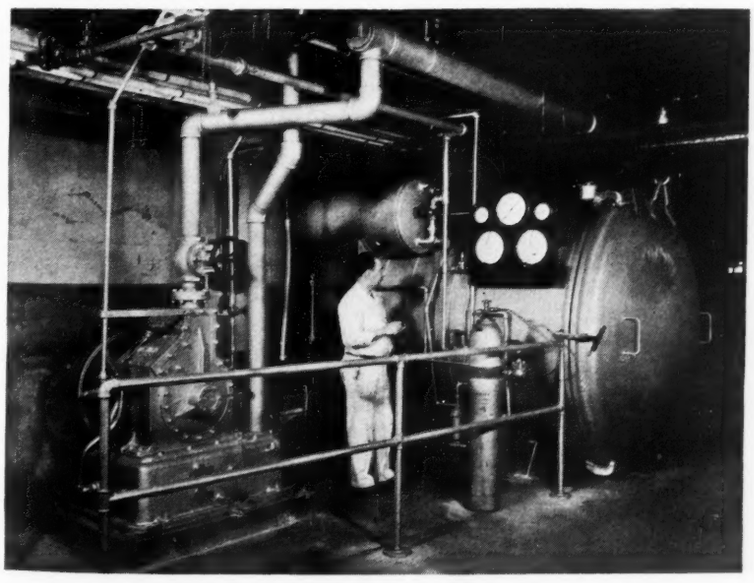
After the tank is filled with the material to be processed, the doors are closed and the tank is made gas-tight. This is accomplished by screwing down the doors with "C" clamps and by means of rubber gaskets on the inner rims of the doors where they fit against the tank openings. The air is then exhausted from the tank by means of a pump which produces a vacuum of 28½ in. within the tank in a few minutes.

Guardite furnished to us in cylinders containing 50 lb. of the compound in semi-liquid form is supplied to an auxiliary tank or accumulator and the compound is allowed to issue from the cylinder into the accumulator, where, by heat and expansion, it is converted into a gas. When the air has been exhausted from the processing tank the gas is permitted to enter. The interior of the tank is kept at the temperature most favorable for processing by means of steam coils. Both the temperature and the pressure inside the processing tank are constantly under check by means of indicating as well as recording thermometers, vacuum gages and pressure gages.

When the materials have been under treatment in the tank for two hours the Guardite gas is pumped out of the tank and allowed to pass out through a vent pipe opening outdoors. Air is admitted to the tank by opening a breaker valve. The "exit" door on the tank is then opened and the materials are brought out into the clean storage room, in which are stored only materials that have been processed.

We do not hesitate to say that we consider our present fumigating installation one of the greatest forward steps that we have made in the manufacture of our products. It enables us to do what we have desired to do for years: insure our jobbers and dealers that our products will reach them free from all insect infestation.

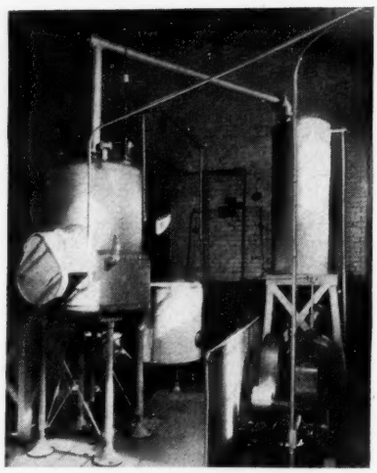
Fig. 2—The exit end of the processing tank opens directly into the storage room. A solid wall, except for a small passage door, separates the receiving room from the storage room.



[1] FOOD INDUSTRIES, September, 1931, p. 398.
[2] FOOD INDUSTRIES, January, 1933, p. 17.

Using Fresh Strawberries In Cordial and Cream Candies

By W. F. ROBERTSON
Framingham, Mass.



Strawberry paste is made under a 28½-in. vacuum.

THE delicate flavor and aroma associated with strawberries may be incorporated in chocolate-covered candies if proper methods are employed from start to finish. A cordial cherry is as common as the corner drug store, but cordial strawberries are not so common and usually, when found, are not as desirable.

The reason for this difference lies in the structure of the fruits. Such fruits as cherries, grapes and pineapple pieces are commonly cordialized in chocolate. A short study of these fruits will show the characteristics which make them so successful, and a study of some others will show why they are not used so readily.

The cherry used is the maraschino style cherry, which is a firm-fleshed fruit with a tough skin. There are other cherries that would be as much of a failure for this use as the strawberry; tender-skinned cherries and soft-fleshed ones would stand neither the preliminary bleaching and coloring given to the maraschino style nor the osmotic action of its cordializing agent. For the same reasons, the grape used is a firm-fleshed, tough-skinned fruit and not like our Concords. The pineapple is woody and, because of its structure, is able to withstand the treatment.

The strawberry developed for size and tenderness has none of these qualities. As soon as this berry is incorporated in a cream in the usual procedure, osmosis begins its deadly work. The berry shrivels and toughens until it not only loses the qualities for which it is prized but actually becomes an objectionable bit of toughness that cannot be eaten with any enjoyment. But strawberry cordials and strawberry creams can be made from real strawberries.

The beginning of good strawberry candies is in the field. Any strawberry cannot be used; it is necessary to have a firm-fleshed, dark-colored and completely ripened berry. The berries must be graded carefully to a predetermined size and handled with great care so that when a berry is cast into the cream it will be the proper size; this will be determined by the size of the mold.

The form used to make the impressions in starch for a 1,700-count cherry would require a strawberry of about the same size after it has been cold-packed. It is important, then, that a berry slightly larger than desired and perfectly ripened be cold-packed in the usual way by using 2 lb. of fruit to each pound of sugar, and rolled while freezing. Great care should be exercised so that this fruit comes out clean and free from all caps. All this care is to eliminate extra handling in the candy plant, where excessive handling crushes the fruit and leads to contamination and later spoilage by yeasts.

When the candy maker receives these solidly frozen berries he will have to exercise great care to deliver the maximum of whole centers to his enrobers. This means ten days to two weeks at a temperature of 32 deg. F. and only overnight at room temperature. Handled in this manner the barrels of strawberries are slowly defrosted, giving the least broken berries from the effects of expanding ice when melting and allows the shrunken berries to plump up again to a suitable shape. The fruit is then carefully separated from the juice and given to the droppers at the moguls in small quantities to minimize the crushing effect of their own weight. If the fruit has not been properly graded or capped, it is necessary to pick the fruit over at this point, resulting in many broken berries and much waste.

The cream to be used should be about the same as for cordial cherries except for a little color, and the liquid content of the strawberry should be slightly higher than that of a cherry. Unless extra handling is necessary, this cordial will keep without benzoate of soda. If a preservative is necessary it is easily added to the cream. The cordialization is so rapid that, with the aid of an inverting enzyme, the sugar concentration soon becomes a preservative. This rapid liquefaction causes trouble as well as being a benefit, because if some of this liquid gets outside of the cream before coating, the chocolate will not stick and results in "leakers." The best way to prevent this is to keep them as cool as possible while the cream is setting and while they are being removed from the starch.

This partially shrunken strawberry buried in cream and chocolate coated becomes a delightful cordial, and although it does shrivel some more, it is still a tempting morsel.

A true strawberry cream should be made both to utilize the waste from the berries used to make the strawberry cordials and to produce another very delicious piece of candy. The juice separated from the berries to be cordialized and some more "2 + 1" fruit (2 lb. fruit + 1 lb. sugar) should be mixed to give the best results. Using 1 bbl. of "2 + 1" strawberries which have been crushed to each 2 bbl. of juice gives about the proper combination. This mixture is concentrated in a glass-lined or stainless-steel vacuum pan to 76 deg. on the sugar scale of an Abbe refractometer, using the highest possible vacuum and consequently the lowest possible temperature. Not less than 28½ in. of vacuum is necessary. Higher concentration than this is not profitable, because at about this point the pulp of the strawberry begins to coat the heating unit in the vacuum pan and the resultant heat losses and caramelization exceed the benefits that might be derived.

This procedure yields a strawberry paste showing a dry-weight moisture content of about 15 per cent. This paste may then be added to a remelt cream that has been made somewhat low in moisture and to which a little color has been added. This cream will cast readily and will carry a very good strawberry flavor. To continue the strawberry effect the center will have strawberry seeds with their little strings attached, which are so common to strawberry products.

Naming varieties of strawberries for these two candies is going a bit far, but experience has shown that a berry such as the Ettersburg does the best job at cordializing because it is small, red and firm. This berry, however, does not have the full aroma and flavor of a Marshall and therefore the added "two plus ones" in making the paste should be Marshalls.

Alcoholized Gasoline for Farm Relief

By R. S. McBRIDE
Editorial Representative, Food Industries
Washington, D. C.

NON-FOOD uses of agricultural food materials are urgently needed. Hence, reasons the legislator, we should arrange that motor fuel, include alcohol made by fermentation from American agricultural materials such as corn, sugar-cane syrup, beet molasses, and other fermentable products. This proposal has received serious legislative attention in several states and in Washington. Because of its important effect on many industries which manufacture food, there should be a clear understanding of what is involved in this proposal.

Alcohol, either alone or mixed with gasoline, can be used in a motor car, and delivers slightly less power per gallon than gasoline alone because of its lower heating value per pound and also its lower weight per gallon. To this extent it detracts from the motor fuel. This disadvantage is somewhat offset by the anti-knock characteristics which it affords in a mixture. Hence for motor cars designed and adjusted for such a product, anything from 1 per cent to 100 per cent alcohol could be used. Probably some technical disadvantage would become significant were more than a very few per cent of alcohol present. With existing motor cars as now adjusted, more than 2 or 3 per cent of added alcohol introduces real operating troubles; hence readjustment of the carburetor is essential. And with larger percentages—say about 10 per cent—some change in design would be desirable for fuel efficiency.

Taking account of these facts, the more conservative legislators propose the requirement of 2 per cent by volume of approved alcohol as a minimum requirement to exempt the motor fuel from increased taxation. It is this leverage of taxation that is proposed as a means for enforcing nationally any federal law. For example, motor fuel might be taxed 3 cents per gallon; but an exemption of 2 cents out of this 3 might be applied if the fuel mixture contained not less than the required percentage of alcohol made from approved raw materials. The constitutional lawyers in Washington say that probably such a procedure would be held by the courts to be proper and within the authority of Congress.

Numerous state legislators, however, have not been so conservative. Particularly in corn-belt states, proposals of 10 per cent by volume of alcohol derived from corn have been suggested in the drafts of laws. That percentage of alcohol could be used—probably could be made in existing plants and would consume considerable corn—but probably would do more harm than good to the farmer. Among the disadvantages alleged for a 10-per cent regulation are: increased incentive for bootlegging of unofficial mixtures, large diversion of alcohol by reclaiming, excessive increase in cost per gallon, and car-operating troubles, particularly in cold weather. More important still would be the opposition on the part of automotive and petroleum interests, who might accept without too much of a fight a low-percentage mixture, but would surely fight a 10-per cent blend.

Increased Cost

Any admixture of alcohol for motor fuel requires either that this material be anhydrous and hence will be at least a cent a gallon more costly to prepare than commercial 95-per cent industrial grades, or that a third blending agent be used. Among the blending agents available are benzol, acetone and the higher synthetic alcohols. With them the ethyl alcohol is kept in solution in the petroleum hydrocarbons, even in cold weather, and there is no danger of water separating out with attendant carburetor freeze-ups, or engine stalling. But such blending agents add significantly to the total cost incurred.

If one assumes that corn is to be purchased at 45 to 50 cents a bushel—the prices talked about by farm-relief advocates—the alcohol will cost from 25 to 30 cents a gallon ready to use at the gasoline-blending plant. Substitution of so high cost a material for 5-cent gasoline, the present refinery price, means at least a half cent a gallon extra at retail for a 2-per cent alcohol motor fuel. This is in effect another tax on the motorist to subsidize the farmer. Superimposed on present burdens and taxes, it might actually hurt the gasoline industry far more than it helps the farmer.

If all the United States gasoline were so blended, about 125 million bushels of corn (from 4 to 5 per cent of a crop) would be needed to make approximately 300 million gallons of alcohol to be used in the 15 billion gallons of gasoline typically consumed in the United States. Existing alcohol plants, by expanding operations from the present 20-per cent to full-capacity operation, could produce nearly this total. For remodeling and conversion of alcohol plants from a molasses to a corn base, a few million dollars of new money would be needed, but the new capital would not be great. The result, however, would still leave serious geographic distortion and impose substantial freight bills on the alcohol made. New plants in new locations might, therefore, prove more economic for part of the production.

Effect on Food Prices

Of direct interest to the food industries would be the byproducts from the corn utilized. Corn oil, corn presscake and minor byproducts of the starch-making and fermentation plants would undoubtedly materially change present economic relations and probably would also alter the present commodity price levels for these goods.

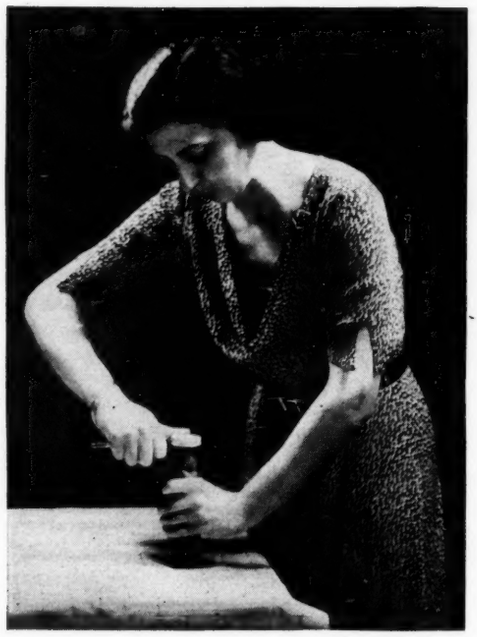
Some manufacturers of cornstarch and other corn products have exhibited concern because of this prospect. Others have appeared to be more worried about the possible effect on the price of corn.

At the price levels of commodities prevailing in mid-April the refinement of corn byproducts is not in the alcohol-gasoline picture. Even those who are heading the drive for the admixture of alcohol admit that, but prices are moving upward and may change the whole economic relationship.

The proposal has now progressed to a point where it is in a position to bid for administration support. James M. Doran, Commissioner of Industrial Alcohol, states that the plan is almost in shape for disposition by Secretary of Agriculture Wallace. A real industry program has been developed which recognizes, says Dr. Doran, that refiners must have some latitude in determining how much alcohol should be added to gasoline of varying qualities and characteristics. Experimental use of mixtures containing 5 per cent and 10 per cent of alcohol did not produce any data that had not been anticipated by scientific investigation, and no water trouble was experienced, according to reports received by Dr. Doran.

State legislation has not yet made any headway and a federal statute establishing uniformity of practice is regarded by Dr. Doran as infinitely preferable to diverse state laws.

When the Screw Cap Sticks How Does a Woman Open the Container?



By M. L. CARR
Director of Laboratory
Pittsburgh Testing Laboratory
Pittsburgh, Pa.

● You may not use screw-top containers, yet your products may be as inaccessible to the housewife as those in some of the containers discussed in this article. After you have read this article you will want to look at your containers through the eyes of the consumer. Do you stand to lose her good will by having your containers a hindrance instead of an aid to her making use of their contents? A critical study of your containers might surprise you.—The Editor.

WHEN the strength of her unaided hands is not enough, how does a woman remove a screw cap from a container? While she can manage most of them, she must encounter enough sticking caps to cause her to develop an opening technique. What does she do? Is she always successful, or do a certain proportion of screw caps stick so tight that she is completely baffled?

In the first two articles of this series, appearing in FOOD INDUSTRIES for March and April, we reported the results of tests to determine how much twisting effort women could exert when removing screw caps and how this strength compared to the mechanically determined twisting force necessary for this task. The third and final set of tests, reported here, was concerned with how women actually remove screw caps in their own kitchens. These tests included observations of how housewives went about removing caps; how much time was required; how successful they were with the two designs of caps employed in the tests; and the methods they used when the strength of their unaided hands was insufficient for the task.

Capped containers were taken directly into the kitchens of fifty Pittsburgh housewives, who were each asked to open ten. Thus 500 jars and bottles were tested in groups. Each group was made up of six bottles with 28-mm. caps and four jars with 63-mm. caps. Half of each size were rolled-on screw caps and the other half were preformed screw caps. Products contained were selected so that a rolled-on screw cap on vinegar would be compared to a preformed screw cap on vinegar, and so on. This had the result of minimizing the effect of the contained product in the comparison.

Of the containers used for these tests, 400 were bought directly from stores in the Pittsburgh district. The containers of this group were given—exactly as purchased from the stores—to the women making the tests. The other 100 containers were those that had been used in the mechanical opening tests described last month. With this latter group, a record had been kept of the amount of twisting effort originally required to remove the caps, and, before the containers were passed on to the housewives, the caps were tightened by means of the laboratory apparatus to the same tightness that they had when purchased. This group of 100 also was segregated, not mixed with the 400 new containers, so that any effect from the removal and replacement of the caps in the mechanical tests could be ascertained.

The complete collection of 500 containers represented the products of 31 packers and were closed with screw caps made by ten closure manufacturers.

Each housewife was requested first to attempt to remove the caps with her unaided hands, using no tools or other means except her own strength. If she found the cap impossible to remove in this way, she was asked to use any ordinary method that she wished, making use of any tools or devices she had available.

The laboratory observer made a record of the results obtained by each woman who cooperated in the tests. Fig. 2 shows a housewife removing the last cap of a group, with the observer in attendance, provided with stopwatch, pen and record blank.

Summarized results of these 500 observations show that 404 out of 500 caps were removed with the unaided hands. Of the remaining 96 caps, 56 were removed by some other method and 40 could not be removed by any method available to the cooperating housewives. Of the 40 that were not removed, 7 were from the group that had been previously opened and had the caps replaced by the laboratory apparatus. This is 7 out of 100, or 7 per cent, while for the other 400 caps the percentage, 33 out of 400, is 8.25. These figures break down into cap sizes and designs as follows: of the 150 rolled-on screw caps of 28-mm. size, 142, or 94.6 per cent, were removed with the unaided hands, 7 were removed by some other method, and there was one which the housewife could not remove. Of the 150 preformed screw caps of this same size, 107, or 71.6 per cent, were removed with the unaided hands, 25 were removed by some other method and 18 proved to be beyond the strength or

ingenuity of the women making the trials.

Rolled-on screw caps in the 63-mm. size had a slightly better record than in the 28-mm. size. Ninety-six out of 100 of these were removed with the unaided hands, 3 by some other method, and one housewife found one that she could not get off at all. With preformed screw caps of 63-mm. diameter, 59 out of 100 were removed with the unaided hands, 21 by some other method, and 20 baffled the women who tried to remove them.

Combining the figures for caps removed with the unaided hands and those for caps removed by some other method, we can make the following comparison with the per cent of containers that remained unopened:

Cap Size and Design	Per Cent Removed by Some Method	Per Cent Which the Women Could Not Remove
28-mm. rolled-on screw..	99.3	0.7
28-mm. preformed screw.	88.0	12.0
63-mm. rolled-on screw..	99.0	1.0
63-mm. preformed screw.	80.0	20.0

Examination of the records of the tests in which housewives failed to open containers reveals the direct relation that exists between cap tightness and difficulty of removal. The tightest cap in the group given to the first woman who made the trials was a 63-mm. preformed screw cap on a jar of mayonnaise. (We know that this was the tightest cap of the ten because all of this group had been used in the mechanical opening tests and their tightness had been determined at the time the caps were replaced.) In the laboratory apparatus, this cap required a twisting force of 57.7 inch-pounds for removal. The housewife was not able to open this jar after trying for six minutes. She hit around the edge of the cap with a knife, soaked it in hot water, and then used the knife to pry between the cap and the glass. Finally she gave up, saying that she would soak the whole container overnight in hot water. The twisting effort required to remove this cap by machine, 57.7 inch-pounds, was beyond the strength of the strongest woman who made the strength tests discussed in FOOD INDUSTRIES for March, who proved to be able to exert 54.7 inch-pounds of twisting effort on a 63-mm. cap.

In another case, a woman proved to be unable to remove a 63-mm. preformed screw cap from a jar of sandwich spread. This was one of the 400 containers that had never been opened, so it was subsequently tested in the laboratory apparatus and was shown to require 102 inch-pounds. This housewife tried for several minutes to open the jar. She hit it a number of times on the floor and then said she would give it to her husband to open.

A previously unopened 28-mm. cap on a bottle of syrup proved beyond the strength of one of the women. She tried for 2½ minutes to remove this preformed screw cap, hitting it several times on the floor. She then said she would put the bottle on the stove to heat and give it to her husband to open that night. This cap proved, in the laboratory apparatus, to require 42 inch-pounds of twisting effort, which was greater than could be exerted on 28-mm. caps by the strongest women who underwent the strength tests.

One woman failed to open a bottle similar to that just described, although its cap came off in the testing apparatus at 24 inch-pounds. This twisting effort is less than that which can be exerted by the strongest woman tested (29.6 inch-pounds for 28-mm. caps), but is greater than the figure for the average woman (18.5 inch-pounds for 28-mm. caps).

Another housewife failed with two preformed screw caps, one of 28-mm. size on salad dressing and the other of 63-mm. size on pickles. She gave both to her husband, but he also was unsuccessful. Tests with the apparatus showed 19.5 inch-pounds of twisting effort necessary to remove the 28-mm. cap and 57 inch-pounds for the 63-mm. cap.

A rolled-on screw cap of 28 mm. on a bottle of vinegar was too tight for one woman. Test showed that this cap required 12.7 inch-pounds of twisting effort for removal. The tests of women's strength showed that that cap could have been removed by a woman of average strength, but that the weakest woman tested could exert a force of only 11.6 inch-pounds on caps of this diameter.

These examples show what happened with some of the containers that could not be opened. The accompanying table summarizes the methods used to open sticking caps. Space prevents giving full details of these opening tests here, but what has been said will serve to show the general trend of the trials.

It is evident that women find the removal of some screw caps beyond the scope of their unaided efforts and that they have developed a rough-and-

(Turn to page 185)

Summary of Methods Used by Housewives to Open Tight Caps

Method Used	Successful Results — Number Caps Removed: Number of Housewives	28-mm. Rolled-on Screw	28-mm. Preformed Screw	63-mm. Rolled-on Screw	63-mm. Preformed Screw	Unsuccessful Results — Number Caps Removed: Number of Housewives	28-mm. Rolled-on Screw	28-mm. Preformed Screw	63-mm. Rolled-on Screw	63-mm. Preformed Screw
Opened all caps with bare hands	6	..	..	..	..	..	..	..	..	..
Hit cap with knife or tool	17	2	12	2	15	15	1	12	..	6
Hit cap on table or floor	6	2	3	1	3	13	..	8	1	7
Placed cap under hot water	2	1	2	..	1	7	..	5	..	5
Used towel or cloth	1	..	1	..	..	3	..	2	..	1
Used pliers	3	..	4	..	..	..	..	..	..	..
Used knife to pry under cap	1	..	..	..	1	5	..	3*	..	3
Gave to other member of family	1	..	..	..	1	2	..	2	..	1
Placed cap over gas flame	1	1	..	..	..	1	..	..	..	1
Used special opening device	1	..	2	..	..	..	..	..	..	..

The number of housewives do not total 50 because some tried other methods and did not succeed.
*Cut hand showing blood.

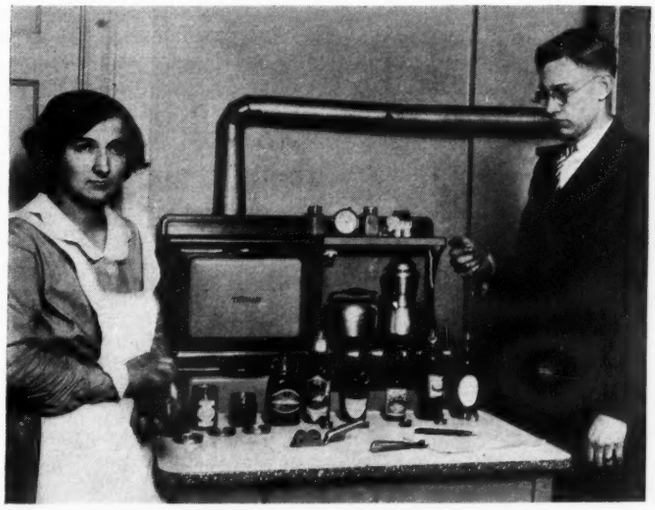


Fig. 2—In the housewife's kitchen, the laboratory's observer took notes of methods used and time consumed in removing screw caps.

Possibilities and Limitations In Canning Orange Juice

By M. A. JOSLYN and C. L. MARSH
Fruit Products Laboratory
University of California

THE RETENTION of the characteristic flavor, color and aroma of orange juice extracted from the fresh fruit has been the goal of many research workers in the field of citrus products. However, the problem of preserving orange juice in its natural state is yet to be completely solved. Our present knowledge concerning its composition and the nature of the changes that occur during the deterioration of the juice is too meager for this. Acceptable products preserved by heat treatment have been made in recent years; and a number of processes have been developed for the canning of orange juice. We find that existing canned juice can be materially improved in flavor by applying to the problem some of the knowledge we already have concerning the nature of the changes involved.

In 1914, Cruess[4] reported that it is possible to produce juice that will retain the agreeable flavor of fresh oranges by settling the fresh juice until it becomes fairly clear, bottling and pasteurizing in the bottle at 180-185 deg. F. To minimize changes in flavor and color, he recommended the addition of a small quantity of sulphur dioxide.

In 1916, McDermott[8] reported that removal of the air dissolved in the juice as well as in the headspace in the container above it, followed by pasteurization at 63 to 65 deg. C. for 15 minutes, was sufficient to prevent the deterioration of orange juice. Removal of the air from and above the juice in the container was effected by replacing the air by some non-oxidizing gas such as nitrogen or carbon dioxide, or by exhausting the container at a vacuum of about 28½ in. while immersed in water slightly above the boiling point at this pressure prior to sealing and pasteurizing. It was subsequently found that, although this process preserved the color of orange juice, it did not preserve its flavor.

In 1920, Chace[3] reported that citrus juices were so disposed to change in flavor when subjected to even a slight amount of heating that it was necessary to avoid overheating citrus juices, and that heating should be rapid in order to avoid development of "cooked taste." To overcome this difficulty he suggested that the juice be sterilized as quickly as possible in a continuous pasteurizer in which the juice was heated in hot water to 185 deg. F. and subsequently cooled in cold water. Unfortunately, the process described above was applied to filtered orange juice. In 1916, Will[9] pointed out that, although it was comparatively easy to clarify an orange juice and bottle and preserve it, such a product was not orange juice in the true sense. He recommended that cloudy orange juice, such as we have today, be used.

Stating a Problem

In 1920, Cruess[5] showed that bottled orange juice does not retain its fresh flavor, but tends, in a few weeks' time, to develop a stale and disagreeable taste. In 1928, Irish[6] found that the undesirable changes in orange juice could be minimized by heating to 180 or 200 deg. F. and then chilling immediately to 40 deg. F. or below in an inclosed system. Later, in a revised edition of Circular 313, it was pointed out that the development of the stale taste in orange juice is caused by a chemical change, apparently, in part at least, induced by enzymes, which are destroyed by a temperature of 190-200 deg. F. This destruction was best carried out by flash pasteurization. It was pointed out by one of us[7] that oxidation, which appears to be the principal cause of deterioration in frozen orange juice, can be almost completely eliminated by de-aeration and handling under an atmosphere of inert gas.

In recent experiments on the canning of orange juice at the U. S. Department of Agriculture, Bureau of Chemistry and Soils, citrus fruit laboratory in Florida, cited in the 1932 annual report, it was found that the following process yields juice that has kept remarkably well. The juice is flash pasteurized in jars, cooled to approximately 70 deg. C. (158 deg. F.) and then subjected to a vacuum until it starts to boil, at which point the container is immediately capped and then cooled.

High Vacuum Essential

In an experimental study on the canning of orange juice, we found that a product of satisfactory quality could be obtained by heating de-aerated juice in a continuous pasteurizer and completely filling citrus-enamel cans with hot juice, sealing, inverting the can to sterilize the lid and cooling rapidly in cold water. Canned juice has been marketed by one concern by a similar process which did not involve de-aeration. We find that subjecting the juice to a high vacuum for a sufficient length of time to remove most of the occluded or dissolved gases is essential to produce acceptable products.

Although juice heated to 165 deg. F. was of fresher flavor at first than that heated at higher temperatures, it deteriorated in flavor and aroma more rapidly than juice heated to 185 deg. F., so that after storage for about four months it was not as acceptable as the product heated to 185 deg. F. We have found that heating at higher temperatures is necessary also to prevent the clearing of the supernatant liquid in the can, a finding that has been confirmed in commercial practice. Cruess[4] in 1914 reported that juice pasteurized at 185 deg. F. did not clear but remained cloudy.

Cool Storage Helps Keep Flavor

However, the canned orange juice, even when prepared as above, did not retain the full fresh orange flavor and aroma during storage at room temperature, but it was superior in flavor to a number of commercially available canned juices now on the market. We found that the deterioration of canned juices so prepared was markedly retarded by storage at 32 deg. F. In fact, after storage for four months, samples stored at room temperature were slightly off in flavor and aroma compared with those stored at 32 deg. F., which were of good, fresh orange flavor. It is therefore essential that the cold storage of canned orange juice be used to increase the retention of flavor and aroma during distribution over a normal marketing period.

We found that orange juice, especially in the presence of air, readily corroded the tin plate. The "detinning" which occurred upon storage in plain tin cans was sufficient to give a markedly objectionable "tinny" taste to the juice. Completely filling the cans with de-aerated juice did not entirely prevent the dissolving of tin and formation of "tinny"

flavors. The flavor of juice packed in charcoal-plate cans was superior to that packed in plain coke-plate tin cans. The use of cans coated with an enamel resistant to the solvent action of orange juice minimized or practically inhibited the formation of "tinny" flavor. Ordinary enamel is not resistant to the action of the oils, acids and other substances present in orange juice; flakes of this enamel separate and float on the surface. As would be expected, the action on ordinary enamel was most profound at the body seam, the top and bottom seals, and expansion rings. A "citrus enamel" resistant to the action of orange juice is now available.

Although juices pasteurized in the bottle discolor and deteriorate in flavor in the presence of air, satisfactory bottled juices can be prepared by pasteurizing de-aerated juice closed under vacuum. However, if the juice is pasteurized at about 165 deg. F., it deteriorates in flavor as described above and if pasteurized at higher temperatures, it has a "cooked taste." Several commercial packers in Florida prepare canned citrus juices by the pasteurization of untreated or de-aerated juices sealed under vacuum. Prompt cooling after heating is essential and is more rapid in tin than in glass containers.

Ultra-Violet Treatment

The possibility of preserving orange juice by irradiation with ultra-violet rays interested research workers even before 1916. However, the early results were not successful. The possibility of accomplishing this was again pointed out in 1931, when Sperti, of the University of Cincinnati, found that the controlled irradiation of orange juice will destroy or inactivate the enzymes responsible for these changes. In popular accounts of his process[1] current in the literature of the time it was pointed out that after the destruction or inactivation of the enzymes such juices could be preserved by pasteurization. In view of this statement, it is quite possible that the ultra-violet irradiation will so alter the causative agencies for deterioration present in orange juice that heating at temperatures of about 165 deg. F. will be sufficiently satisfactory for preservation. If so canned, juices of better flavor may be prepared. However, even these juices may have to be stored at 32-40 deg. F. during distribution.

It was reported in 1919 that vitamin C is unaffected by ultra-violet rays, *provided* it is at the same time protected from oxidation.[10] Consequently, in order to protect the juice from the action of ozone or other substance formed by irradiation in the presence of air, it may be necessary to remove the dissolved air from the juice and to carry out the irradiation *in vacuo*. We are planning to study the changes that occur during irradiation of the juice by following changes in its reducing value and similar properties, but have made no study of this process as yet.

It is quite possible that more "intelligent" methods of extraction will also lead to prepared citrus juices of higher quality. During the course of investigations on frozen orange juice we have found that the presence of certain tissues in extracted orange juice increases the rate of deterioration of the juice. Camp[2] *et al.* have reported that the method of extraction plays an important rôle in deterioration of the juice. It is desirable that the material contained in the juice sacs be not brought in contact with segments of the carpellary membrane, the vascular elements, the inner peel or the albedo. We find that precooling the fruit prior to extraction reduces the changes brought about by the tissues during extraction by burring or reaming.

Metallic contamination of the juice during extraction and handling must be avoided, since our experiments show that the flavor of orange juice is markedly impaired by even small quantities of copper and iron salts as well as by traces of certain other metals in solution. Certain of the metals studied—notably iron—seem to exert a catalytic effect, while others exert an immediate and pronounced effect. Aluminum and corrosion-resistant alloy steels have been found to be superior to other metals for the handling of orange juice, although under certain conditions nickel also is satisfactory.

The introduction of oil from the peel into orange juice during extraction is not desirable, since the decomposition of the oil results in a "turpentine" taste. The addition of perceptible quantities of oil—0.005 per cent or over—increases the tendency of the juice to deteriorate. However, the well known use of oil for improving the flavor and masking undesirable flavors present has been found to be desirable by Camp *et al.*[2] under certain conditions.

To prepare juice of high quality it is essential that good fruit be used. Freshly picked tree-ripened fruit at its optimum stage of maturity is best suited for juice purposes. Variety of fruit used is an important factor in the quality of canned juice. Valencia, Mediterranean Sweets or St. Michaels have been found satisfactory for juice purposes.

The ideal juice—one to which nothing has been added, from which nothing has been abstracted, and in which nothing has been destroyed—is yet to be prepared. However, we are nearer a solution of the problem today than we were in 1916, when Will[9] pointed out that "the discovery of what has baffled others will not be made by the efforts of inexperienced chemists with a poor sense of taste and smell, who produce products by secret processes." It is unfortunate that lack of published information concerning the preservation of orange juice should lead to the introduction of secret processes which in many cases have been found to be unreliable. We strongly recommend that all secret processes be fully and completely tested before being put into practice.

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Recirculating Process Lowers Cost of Vinegar Production

By A. L. NUGEY
Consulting Engineer,
Rahway, N. J.

By cooling the vinegar stock as it passes through the surge tank 100-grain vinegar can be produced in a single but a larger-capacity generator.

DISTILLED vinegar, 100-grain strength, produced at a direct cost of less than 7c. per gallon, is within the reach of any vinegar manufacturer provided he will avail himself of latest developments in plant operation. Raw material and labor costs have already been reduced to almost unbelievable levels, yet current business conditions demand that production costs be cut still further if competition is to be met on a profitable basis. The object of this article is to present a study of the factors involved in the manufacture of vinegar and to point out to the vinegar manufacturer a simple method by which he can revamp his plant and manufacturing process at a moderate cost and reduce his production costs sufficiently to produce 100-grain vinegar at less than 7c per gallon.

Expressed in its simplest terms, the manufacture of vinegar is nothing more than the conversion of an alcohol solution into an acetic acid solution. This change takes place in the theoretical ratio of 46 parts by weight of alcohol to 60 parts by weight of acetic acid. It involves a chemical reaction between the 46 parts of alcohol and 32 parts by weight of oxygen to give the 60 parts of acetic acid plus 18 parts of water:

$$C_2H_5OH + O_2 \rightarrow CH_3COOH + H_2O$$
$$(46) \quad (32) \quad (60) \quad (18)$$
$$+ \text{ heat of reaction}$$

On the basis of this reaction 100 lb. of alcohol will produce 170 lb. of vinegar. In commercial practice this yield, of course, is not obtainable. Experience shows that the actual yield rarely exceeds 80 per cent of the theoretical. Formation of other compounds and the evaporation losses of both alcohol and acetic acid account for the 20 per cent shrinkage.

It is not essential that the start be made with alcohol. Vinegar can be made from any liquid containing sugar, provided an alcoholic fermentation precedes the acetic fermentation, which, chemically speaking, is an oxidizing reaction. An empirical illustration of this conversion may be expressed in this manner:

Sugar + fermentation → alcohol + carbon dioxide

Alcohol + oxidation → acetic acid + water + heat

Vinegars may vary from water white to dark brown in color. Their respective flavors depend upon the care taken in the selection and the subsequent fermentation of the raw materials from which they are made. Those most commonly met with in commerce are cider, corn sugar, malt, and distilled grain vinegar. They take their grade designation from the source of the carbohydrate-bearing material from which they are made, viz: apple cider, corn sugar, barley malt, and grain.

Of these four grades the greatest commercial interest lies in the distilled vinegar made from grain. By Federal Food and Drug Administration definition, this vinegar is the product made by the acetic fermentation of dilute alcoholic solutions and shall contain not less than 4 grams of acetic acid per 100 cc. of the solution measured. However, the usual concentrations of distilled vinegar, as manufactured, run from 8 to 12 per cent acetic acid and are commonly called 80- to 120-grain vinegar.

Only those larger manufacturers who may have a reliable and cheap source of raw materials should attempt to make their own supply of alcohol. In addition to being more economical, smaller vinegar manufacturers will find that a better grade of vinegar will be produced if they buy their alcohol rather than manufacture it.

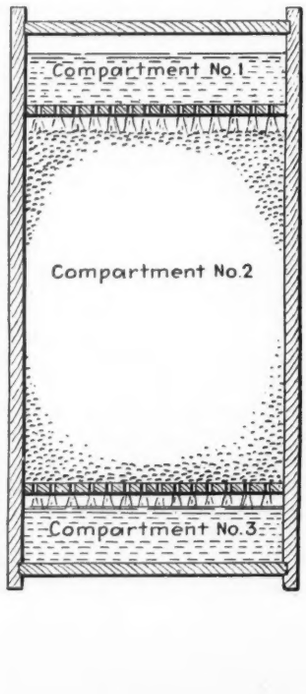
Conversion of the alcohol into acetic acid takes place in units known as generators, which are the most important units of equipment in the vinegar factory. In these units take place the losses due to side chemical reactions and evaporation as well as the conversion of the alcohol into acetic acid.

Consequently, in order to manufacture a vinegar of any specified strength, it is necessary to use an alcohol solution or a vinegar gyle of such strength that provides allowance for losses and at the same time produces the proper strength of acetic acid. Therefore, to obtain an acetic acid of the specified strength it is highly important to know the concentrations of the vinegar gyle before allowing it to enter the generators. Of course, this can be determined by a simple test; nevertheless, it is neglected by many vinegar manufacturers.

Also, numerous manufacturers have attempted to produce 100-grain vinegar by a single passage of the vinegar gyle through a single battery of generators. Tests have proved that concentrations of alcohol in the amount of 10 per cent and acetic acid up to 13 per cent actually kill the vinegar-forming organisms. On the other hand, the full activity of these vinegar-forming organisms is not secured until the acidity reaches at least 2 per cent. One must realize that, in order to produce 100-grain vinegar by a single passage through a generator it would be necessary to have so much alcohol in the vinegar stock that its presence would destroy the acetifying bacteria.

A generator (Fig. 1) may be described as a large vertically set cylindrical wood tank divided into three horizontal compartments: the top compartment (No. 1), used for distributing the alcoholic solution over the beechwood shavings which are packed in the middle compartment (No. 2), and finally a bottom compartment (No. 3) in which the solution collects after pass-

Fig. 1—A vertical cross-section of a vinegar generator.



ing through the shavings. The beechwood shavings are supported by a perforated false bottom, which also provides for an even distribution of inlet air. Generators are made from tongue-and-grooved cypress or fir wood. The staves are securely bound together by means of external steel hoops fitted with turnbuckles.

There is considerable variation in the dimensions of generators in use. The majority of generators are 4x8 ft. Since the War there has been a tendency of vinegar manufacturers to use larger size generators. These larger generators, which will cost less than an equivalent number of the smaller generators, are fed with rotating sprinklers in place of the usual wood dumper, thus assuring more efficient operation. Similarly, the maintenance is materially reduced. The following table gives the capacities of the generators based on 100-grain vinegar production:

Size of Generator	Capacity, Gal. per Day
4x 8 ft.	8
10x20 ft.	85

In the group system of operation using a multitude of generators, the vinegar stock, water and alcohol mixture is passed through two or three sets of generators which are connected in series (Fig. 2). In this process of operation, the generators will yield a product containing about 6.0 per cent acetic acid. After testing the acid content of the vinegar a sufficient quantity of strong alcohol is added to raise the concentration of the alcohol in the vinegar to about 4½ per cent. Then the alcohol and the 60-grain vinegar is passed through a second group of generators, in which the alcoholic conversion takes place, raising the resultant vinegar to 100-grain. Should a higher-grain vinegar be desired, more alcohol must be added and the solution passed through another group of generators.

If the generators are to produce satisfactory vinegar, it is very important that the air supply be accurately regulated. Another important factor is that the vinegar stock which passes through the generators also be well controlled. This is because various temperatures are required by the different fermenting organisms. In commencing the operation, it is essential that the vinegar stock be maintained at 70 deg. F. If the workroom temperature is too low, the vinegar stock must be warmed; if the workroom temperature is too high, the vinegar stock must be cooled. During the acetification of the alcohol the temperatures within the generators will rise to about 95 deg. F. We have found some instances in which the optimum temperatures are more satisfactory at 110 deg. F. Nevertheless, we believe that the normal operating temperatures will range from 90 to 100 deg. F. It is necessary to control the workroom temperature either by heating it or by cooling it with brine circulation in connection with cold diffusing units, because the air is taken directly from the workroom. We believe that a variation of not more than 20 deg. F., plus or minus measured from the generator temperature, will produce satisfactory results. It is obvious that if the generator temperature rises to abnormal working temperatures a considerable loss of product will result from evaporation, whereas, if the temperature drops too low, there will be an incomplete conversion of the alcohol.

The air supply controls the temperature inside the generator as the vinegar stock passes through it. This is regulated by means of ventilating plug cocks located near the bottom of the generator. If the best vinegar is to be made with this process, it is necessary to control the air temperature, the mix temperature and quantity of mix that is to be fed. This process of making vinegar is called the "old" rapid process and its flow chart is illustrated in Fig. 2. The quality of grain vinegar produced by this process, with properly controlled temperatures and rate of feed, commands such an attractive market price that, even today, many vinegar factories are using this older process. The objection to this process is greater capital investment and greater manufacturing costs. It is these two factors alone which determine whether the manufacturer is to remain in a profitable business or is to be thrown into the ever increasing list of business mortalities.

As early as 1832, the "quick" process of vinegar production was originated. In this process the surface area of the vinegar stock in contact with oxidizing air was increased many times by pumping the vinegar stock over and over the bed of shavings, and counter to the current of ascending oxidizing air. A

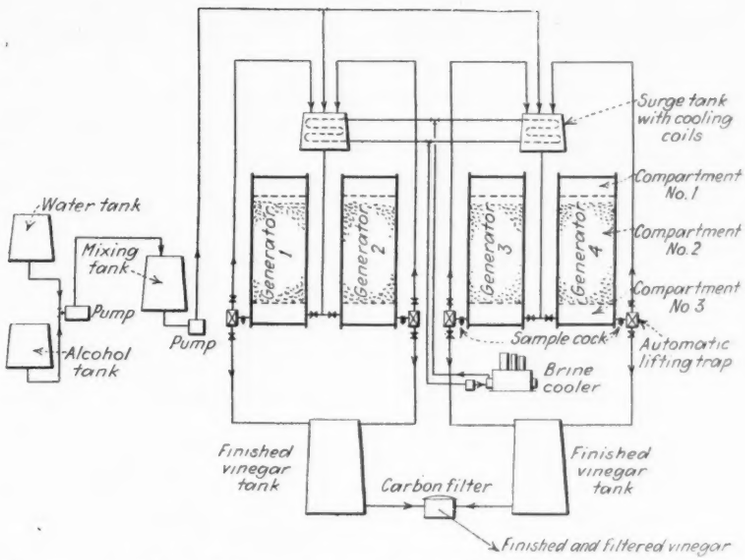


Fig. 3—Cooling of vinegar stock between passages through the generator permits recirculation through a single and larger-capacity generator.

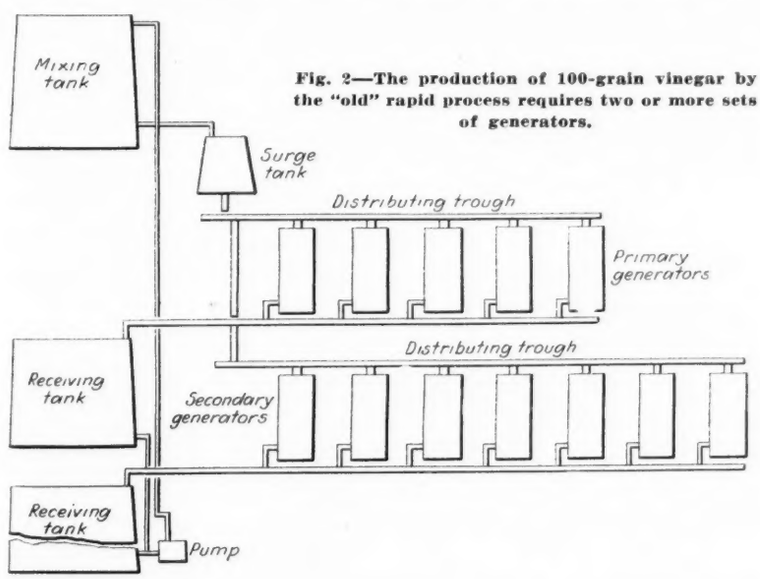


Fig. 2—The production of 100-grain vinegar by the "old" rapid process requires two or more sets of generators.

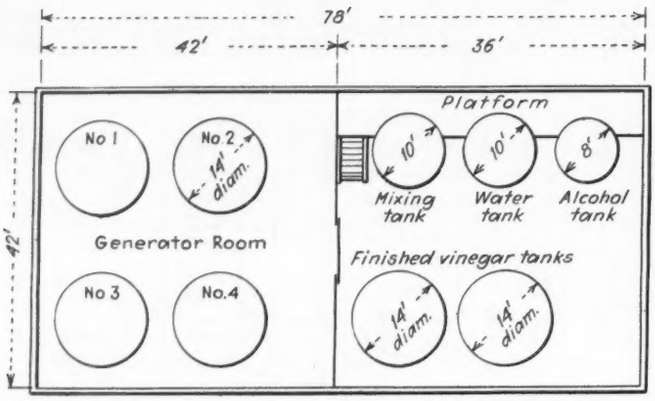


Fig. 4—Only 3,276 sq.ft. of plant floor space is required to produce 100-grain vinegar at the rate of 1,000 gal. per day by the recirculating process.

significant difference between the "old" and the "improved" rapid processes of vinegar production is shown by the following comparison:

Process	Capacity of Plant, Gal. per Day	Size of Generator	No. of Generators
"Old" rapid.....	1,000	4x 8 ft.	125
"Improved" rapid	1,000	14x16 ft.	4

In the "improved" rapid process the generator-capacity requirements are only about 23 per cent of those in the "old" rapid process. From this comparison, it is apparent that the development of the "improved" rapid process represents progress, and constitutes an achievement which, if not startling, at least introduces into vinegar manufacture a new principle with potential capabilities. Therefore, in this brief general review of vinegar-plant modernization, the economic aspects of "improved" rapid process should be considered. Also it should be borne in mind that adoption of this process by vinegar manufacturers does not necessarily mean that all of their present vinegar-plant equipment should be scrapped.

The construction of the generators in connection with the "old" rapid-process has been previously shown (Fig. 1). A little study will prove that practically no changes will be necessary in these generators to convert them from the "old" operating types to the "improved" rapid operating types. Fig. 3 illustrates the complete flow diagram for a 1,000 gal.-per-day distilled vinegar plant by the "improved" rapid process. Fig. 4 illustrates the actual floor space required by this plant. In the "improved" rapid process the following operating procedure is followed:

The alcohol (grain alcohol specially denatured formula 35A), water, and vinegar stock are mixed in accordance with the formula (alcohol, 1.16 gal.; vinegar stock, 1.00 gal.; water, 7.33 gal. to make a total of 9.49 gal.) within the mixing tank (see flow diagram, Fig. 3).

This solution is charged into the overhead surge tank, from which it flows by gravity to the generators, and is uniformly distributed over the beechwood shavings contained in compartment No. 2 of the generators. The air supply ascends and oxidizes the downcoming alcohol. As the air becomes warmer than the workroom temperature, due to the heat evolved through the bacterial oxidation of alcohol into acetic acid, it becomes necessary to cool, artificially, the solution which continues to flow by gravity from the surge tank. This is easily accomplished by placing brine cooling coils within the surge tank. As the solution percolates through the beechwood shavings and collects in the compartment No. 3, the automatic all-bronze lifting trap, of standard design and controlled through electrical relays by means of a float within the compartment No. 3, raises the solution to the surge tank. This cycle continues as long as the oxidizing reaction in the generator requires it.

When the reaction has progressed sufficiently to give vinegar of the desired acid strength, the lifting trap automatically stops. It subsequently starts again when a new charge is admitted to the generator. Sampling connections should be provided in compartment No. 1 for determining the oxygen and carbon-dioxide content of that compartment. If the oxygen content is too high, it indicates that an excessive quantity of air is being supplied, and immediate steps should be taken to reduce it. If, on the other hand, the oxygen content is too low, then more air must be admitted. Likewise, the carbon-dioxide content should be determined, because considerable quantities of carbon dioxide will occur only when the generator receives so little alcohol in the feed that the acetic bacteria oxidize its own acetic acid to carbon dioxide. If too much carbon dioxide is noted, more alcohol must be fed. This is accomplished by increasing the volume of the feed and increasing the circulating time.

When after continuous recirculation, it is found that the alcohol has been completely acidified, the vinegar is regarded as finished, and is pumped into the finished vinegar storage tanks. The next batch is charged from the mixing tank into compartment No. 3 of the generator and the operation of the generator is recycled. Before the finished vinegar is barreled, it is passed through a carbon filter to remove foreign colors. A carbon filter, which may also be used for filtering other food liquids, is manufactured by the Woodbridge Ceramic Corp., Woodbridge, N. J., and is composed of a ceramic outer shell with horizontal inner carbon filters. It will not only remove all off-colors but will also remove the cloudiness, or "mother," from the vinegar and make it crystal clear.

The size of the generators needed for a 1,000-gal.-per-day distilled-vinegar plant are 14 ft. inside diameter by 16 ft. inside height. Only four generators are needed. The generator heads are of 3-in. material; the false bottom is of 3½-in. material; the bottom is of 4-in. material; and the staves are of 3-in. material. The false bottom is perforated to permit seepage of solution and passage of air. This false bottom also supports the 1,800 lb. of beechwood shavings. A false top is provided with ferrules to permit even distribution of the solution to the beechwood shavings and to eliminate air binding.

This "improved" rapid process of vinegar production will no doubt revolutionize the manufacture of distilled vinegar, as it eliminates the large number of generators, causes less evaporation losses and gives maximum yields.

Table I contains the estimated cost to make vinegar by the "improved" rapid process. Manufacturers considering erecting entirely new plants will find in Table II an estimate of what a new plant will cost, based entirely upon new equipment.

Table I—Cost to Produce 100-Grain Vinegar

(Capacity of plant, 1,000 gal. per day)

Daily Operating Cost		
109 gal. alcohol @ 33c. per gal.	$35.97	
891 gal. water	2.00	
Supervision and labor	15.00	
Power and light	5.00	
Miscellaneous overhead	1.40	
		$59.37
Daily Fixed Charges		
Depreciation	$2.80	
Taxes	1.75	
Insurance	.75	
Interest on investment	2.50	
Rental of floor space	1.75	
		9.55
		$68.92

Production = 1,000 gal. of vinegar per day.
Cost to produce vinegar = $68.92 / 1,000 = $0.069 per gallon.

Table II—Estimated Cost of Vinegar Plant, Erected

(Capacity, 1,000 gal. of 100-grain vinegar per day)

4—14x16 ft. wood generators	$3,000
Necessary beechwood shavings	2,500
1—Wood mixing tank	100
1—Wood water storage tank	100
1—Steel alcohol storage tank	300
2—14x16 ft. finished vinegar storage tanks	850
1—Transfer pump	350
1—Filter, with carbon filtering media	500
Necessary cooling interchangers, controls, meters, pumps, for 4-generators and cooling units	6,000
Rubber hose	100
Insurance	1,200
Total cost of erected plant	$15,000

Quick-Freezing Destroys Parasites of Trichinous Pork*

By DONALD K. TRESSLER
Chief Chemist, Birdseye Laboratories
Gloucester, Mass.

FOR many years it has been known that the freezing and subsequent cold storage of pork destroyed any trichinella larvæ contained therein, but no one had studied the influence of the rate of freezing and the ultimate temperature reached on the viability of the parasite. In 1916, B. H. Ransom (*J. Agr. Res.*, Vol. 5, pp. 819-854), of the Bureau of Animal Industry, U. S. Department of Agriculture, studied the destruction of this parasite by ordinary slow-freezing and refrigeration at the usual cold-storage temperatures. His results indicated that ten days' refrigeration at 5 deg. F. was sufficient to kill the larvæ. However, he recommended a 100 per cent factor of safety—viz., ten days' additional storage at 0 deg. F., or twenty days in all, so that there could be no question that all the trichinella organisms would be killed by the cold.

Trichinous pork is far more common than most persons suppose. According to Hegner, Root and Augustine (*Animal Parasitology*, 1929, New York), the infection in American hogs has been accurately estimated to be between 1 and 2 per cent. Assuming the lower figure to be correct, a total of about 120,000,000 lb. of infected pork is marketed in this country annually.

Trichinosis in man is by no means unusual in the United States, although the actual incidence is not known, because light cases fail to come under the physician's case or are wrongly diagnosed. Often the physician does not recognize the disease, and the correct diagnosis is not made unless the patient goes to a hospital. Even under these conditions twenty cases were reported in Massachusetts in 1930. Ransom states that the mortality is estimated at between 6 and 16 per cent.

The frequency of this disease in man depends not only upon the frequency of the infection in hogs but also upon the extent to which raw or insufficiently cooked pork is eaten. The English and French, who habitually cook their pork thoroughly, rarely have the disease. Fatal epidemics occur chiefly among people of the German, Austrian and Italian nationalities, who are fond of raw pork, especially in the form of sausages and spiced hams.

The Federal Inspector's mark, "U. S. Inspected and Passed," is not a guarantee that the pork is trichinæ-free, as a microscopic examination for *Trichinella spiralis* is not included in the meat inspection in this country. The reason for this is that the present methods of examining pork for these parasites are not considered reliable.

In his preliminary experiment, Augustine inserted trichinous material and thermocouples into the center of raw pork-loin roasts. The meat was then quick-frozen in a multiple-plate froster, the plates of which were refrigerated to —30 deg. F. with ammonia. When the thermocouples indicated a temperature of 0 deg. F. at the center, the roasts were removed from the froster. One was examined immediately; the remainder were placed in storage at 0 deg. F. One of the three was removed after 14 hours, a second after 24 hours, and the third after 39 hours. Virulent trichinella larvæ were found in the roast examined immediately after removal from the froster. Some apparently living trichinella larvæ were found in the meat held in storage 14 hours, but it did not produce infection when fed to experimental animals. After 24 hours' storage at 0 deg. F. no living trichinella larvæ were found in the meat and no infection was caused by the feeding of the meat.

Multi-plate freezer in "open" position to permit unloading. When "freezing," the packages are under pressure and in direct contact with the plates on top and bottom.

These results, which are summarized in Table I, are significant, since commercially quick-frozen pork is carried down to 0 deg. F. or lower in the quick-freezing process and is stored at 0 deg. F. for periods much longer than 24 hours. Therefore it is trichinæ-free.

In a second experiment, Augustine determined the temperature to which trichinous material inserted in pork roasts must be lowered in a multiple-plate freezer in order to kill the parasites if the meat were allowed to thaw immediately upon removal, without subjecting it to any subsequent cold storage. His results are summarized in Table II.

These data indicate that quick-freezing of pork to —28.7 deg. F. in a multiple-plate froster is sufficient, without any subsequent cold storage, to kill or make harmless any trichinella larvæ.

Table I—Results of Quick-Freezing and Storage Upon

Exp. No.	Time in plate froster	Temperature of trichinous material when removed from froster	Storage at 0 deg. F.	Examination of freed larvae: Number examined	Examination of freed larvae: Number apparently normal	Tests on animals: Fed defrosted meat*: Positive	Fed defrosted meat*: Negative	Fed freed larvae*: Positive	Fed freed larvae*: Negative	Fed unfrozen meat† (Controls): Positive	Fed unfrozen meat† (Controls): Negative
Control	0 hr.	...	...	...	...	...	...	...	...	4	0
A	3 hr. 45 min.	0 deg. F.	0 hr.	40	33	5	0	6	0		
B	4 hr. 25 min.	0 deg. F.	14 hr.	78	2	0	5	0	6		
C	3 hr. 50 min.	0 deg. F.	24 hr.	63	0			0	5		
D	4 hr. 2 min.	0 deg. F.	39 hr.	54	0			0	5		

*White mice. †Guinea pigs.

Table II—Effects of Quick-Freezing Upon Encysted Trichinella Larvæ

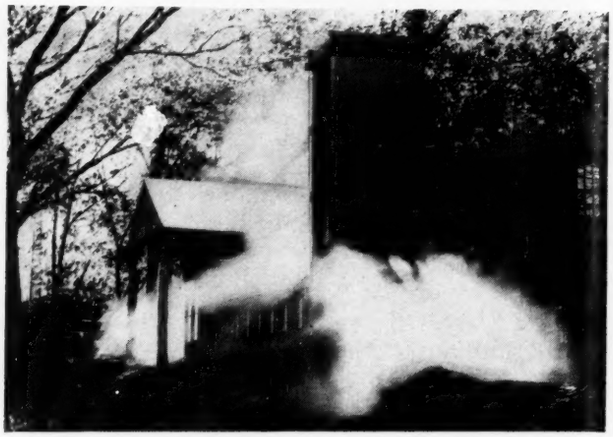
Exp. No.	Quantity of meat frozen	Time in plate froster	Temperature of meat when removed from plate froster Deg. F.	Examination of larvae: Encysted	Examination of larvae: Freed: Number examined	Examination of larvae: Freed: Number apparently normal	Tests on animals (mice): Fed defrosted meat: Positive	Fed defrosted meat: Negative	Fed freed larvae: Positive	Fed freed larvae: Negative	Fed unfrozen meat (Controls): Positive	Fed unfrozen meat (Controls): Negative
E	4 lb. 4 oz.	3 hr. 44 min.	—0.6	Normal	97	97	9*	0	10*	0	2*	0
F	4 lb.	4 hr.	—5.9	Normal	50	50	13*	0	6*	0	2*	0
G	4 lb.	4 hr. 5 min.	—12.7	Somewhat angular	66	64	4†	0	6†	0	2*	0
H	4 lb. 1 oz.	4 hr. 19 min.	—17.7	Angular	109	105	7†	0	4†	0	2*	0
I	3 lb. 4 oz.	4 hr. 33 min.	—23.7	Angular	36	20	2‡	2	3‡	2	1*	0
J	3 lb. 8 oz.	5 hr. 10½ min.	—28.7	Angular, hyaline	147	18	0	15	0	12	1*	0
K	3 lb. 14 oz.	6 hr. 1 min.	—30.3	Angular, hyaline	139	0	0	11	0	9	1*	0

*Moderately heavy infection. †Slight infection. ‡Very slight infection, single larvae in half of diaphragm of each mouse.

*A report on the paper presented by Donald L. Augustine, of the Harvard Medical School, at annual meeting of the Society of Parasitologists at Atlantic City, N. J., Dec. 30, 1932.

DUST EXPLOSIONS

How to minimize their destructive force by proper use of vents*



Typical explosion without breakage of glass, Arlington station

EXPLOSIONS are certain to occur in industries which produce combustible dusts. But the serious consequences of such accidents can be minimized by the proper use of light construction, hinged panels, or large glass and sash areas that give quick venting at low pressures. Built-up pressures produce undue spread of flame and secondary explosions, which are responsible for most of the deaths and property damage.

To obtain accurate data on the venting area required for various explosive dusts with the different types of venting, special apparatus and equipment have been installed at the Arlington (Va.) Experiment Station of the U. S. Department of Agriculture. This experimental structure consists of a room, a gallery and a tower. The fixed glass windows provide a factor of safety, since they break with excessive pressure and form a sort of safety valve. To produce an experimental explosion, dust contained in cups inside the structure is sprayed into the atmosphere by jets of compressed air. Ignition is produced by an electric heater coil. Pressures are recorded by rubber diaphragm manometers recording pressure up to 800 lb. per sq.ft. Steel doors of different sizes, operating only against their own inertia, are used as vents.[1]

That too much dependence may be placed on fixed glass as a means of venting explosions in industrial plants is an important possibility. Standard factory sizes, 12x18 in. and 14x20 in., of double-strength A-quality glass set in steel sash and wooden frames have in a number of cases withstood pressures of more than 300 lb. per sq.ft. In several instances, pressures of 400 lb. per sq.ft. or more were recorded without breaking the glass. Assuming 300 lb. per sq.ft. as the pressure such glass could be expected to withstand, the total pressure exerted on a 4x8-ft. window sash would be almost five tons. Such pressures are capable of causing serious damage to both structure and equipment. This fact explains why, in a number of factory explosions, the entire steel sash has been blown out, and it indicates the necessity of providing vents that operate at much lower pressures.

It having been assumed that the breaking of glass indicated a pressure at which structural damage would occur, several series of explosion tests were planned. A rather lengthy series was carried out to determine the venting area required to prevent the breaking of fixed glass. Starting with the room alone, which has a volume of 100 cu.ft., 58 explosions of starch dust were produced with different arrangements of vent openings. Although a number of factors had a bearing on the results obtained, the general conclusion was that 3 sq.ft. of vent area for each 100 cu.ft. of volume would be necessary to provide satisfactory venting for an explosion of starch dust in a cube-shaped room of small size.

With grain dust, slightly different results were obtained. Sixty-six explosions were produced with different arrangements of the vent openings. The amount of vent opening was gradually reduced until breakage of glass occurred. Based on the results obtained, 1.25 sq.ft. per 100 cu.ft. of volume is recommended as the vent area for cube-shaped or approximately square rooms of small size.

Although no extensive tests were made with other dusts, there were enough to compare the pressures with those of starch- and grain-dust explosions. The results obtained with sugar and powdered milk, as well as with wood flour, sulphur, cork, soap powder, wood charcoal and similar products, indicated that the venting necessary for these dusts ranges between the requirements for starch and grain dust.

When the tests were extended to include the gallery and tower, the results definitely indicated that the shape of the room has an important bearing on the area and the location of the vents. It was found, for instance, that an explosion propagating through the gallery, which is $2\frac{1}{2}$x$2\frac{1}{2}$x20 ft., produced a gun-barrel effect. Glass along the side of the gallery was broken before the pressure could be released through openings at the end, these openings being of the size recommended for cube-shaped rooms.

A few explosions in the tower indicated that the conditions met in long, narrow galleries also existed in deep, small-diameter bins, and venting at the top only, in the ratio recommended for rooms, would not be satisfactory.

In the room tests with the ignition at the center and the vents centrally located in each panel, very little could be done in the way of studying the effect of location and distribution of vents. There was an indication, however, that one or two large vents were more effective than several smaller ones totaling the same vent area, this probably

[1]Several types of swinging vents for lower pressures are recommended in the safety codes of the National Fire Protection Association.

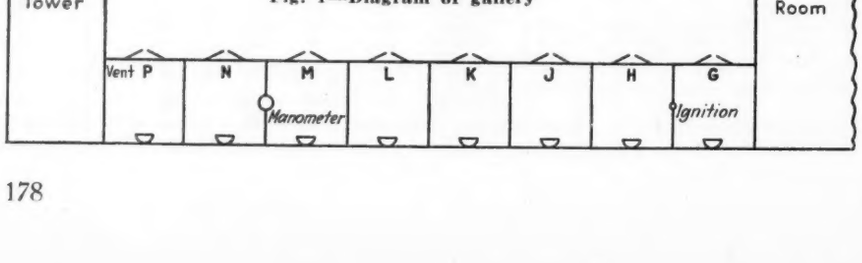


Fig. 1—Diagram of gallery

*From a report by Hylton R. Brown and Richard L. Hanson, chemical engineers, Bureau of Chemistry and Soils, Washington, D. C. A complete statement of experimental work to date was published in the *National Fire Protection Association Quarterly*, April, 1933.

Table I—Gallery Tests (Grain Dust)

Vents Used	No. of Tests	Total Vent Areas (sq. ft.)	Glass Broken	Average Pressure (lb./ sq. ft.)	Vent area per 100 cu.ft. (sq. ft..
NP.....	11	2.0	7	356	1.6
½G.....	9	0.5	None	214	0.4
NP&½M	3	2.5	None	141	2.0
HKMP*	2	1.0	None	312	0.8
HKMP*	3	1.7	None	153	1.35
All Vents*	2	1.5	None	172	1.2

*Part opening.

being due to the resistance offered to flow through small openings.

The effect of location and distribution of vents was most successfully studied in the gallery tests (Table I). The gallery, shown in Fig. 1, was used as a closed unit. The ignition in each case was located in the center of the gallery section below vents *G* and *H*. The manometer was located as shown. Grain dust was used throughout.

From the table it may be seen how vents *N* and *P* at the end away from the ignition are inadequate protection, although they more than conform to the total vent area required for a cubical structure. Conversely, ½*G* provided all the venting necessary to prevent breakage of glass. Here the vent area was much less than that required in a cubical structure of similar volume. This vent, being so close to the ignition source, dissipated the pressure rapidly and permitted a very slow propagation toward the closed end of the gallery. This method of protection cannot be recommended, because the exact point of ignition in an industrial-plant explosion is not predetermined. However, the data show how much more effective the vent becomes when it is located close to the ignition source.

When the venting was distributed along the gallery and either four vents or all eight vents were used, the amount of safe opening corresponded very closely to that for the room tests. This is shown in the lower part of the table. As the venting of the gallery at the end opposite the ignition was extended to include *NP* and ½*M*, sufficient protection was furnished to lower the pressures and prevent glass damage. It may be seen that this is not entirely due to the increased vent area, part of the result being effected by wider distribution of the vents. Tests with starch dust further emphasized this advantage of distribution.

If any elongated structure is to be protected against dust explosions, whether it be tower, gallery or L-shaped building, the building should be sectioned into cubical units. Each unit should then be vented according to its volume, the vents being located in the roof or outer wall. When a dust hazard is in the center of a building between floors where the distance to an outer wall exceeds the height of the ceiling, venting is difficult and complicated.

Undoubtedly, the size and type of ignitor is responsible for many of the differences noted in dust-explosion tests. For instance, explosions in the gallery and tower occurred much more quickly, and the pressures rose much more rapidly, when the dust clouds were ignited by a flash from a primary explosion in the adjoining room than when the coil alone was used as the source of ignition. This difference is believed to be due to the fact that the flash, vented through a small opening into the gallery, ignited the dust cloud along a line 8 ft. or more in length. The hot coil, however, produced ignition only at one point.

Explosions of grain dust ignited by a hot coil in the gallery produced an average pressure of about 180 lb. per sq.ft. when 3 sq.ft. of vent area was provided.

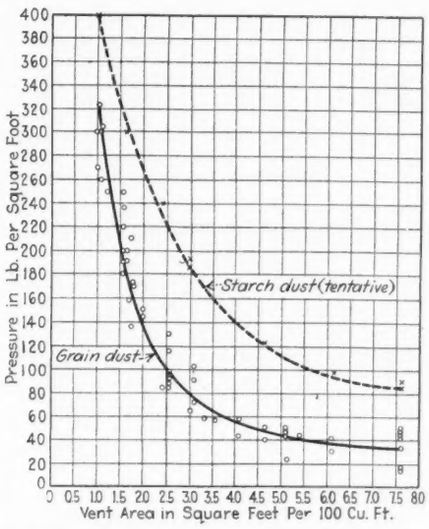


Fig. 2—Reduction of pressure with increase of vent area in a cubical structure

When ignition was produced by a flash from a primary explosion in the adjoining room, the average pressure was about 280 lb., and in one case glass was broken. Further tests gave like results.

This indicates clearly the difficulty of venting a secondary explosion, and it emphasizes the advantage of providing sufficient openings at all points in the structure to vent properly any primary explosion at the origin. By such means, the secondary explosion may be prevented.

The venting area per unit of volume previously recommended is believed to be the minimum that should be used to provide protection against structural damage. Any additional venting that can be provided will pay good dividends should an explosion occur, because pressures drop rapidly as the venting area is increased. This is shown graphically in Fig. 2. The data given in Fig. 2 are for cube-shaped units or small, square rooms. However, a few shots in the gallery and tower indicated that vents in approximately the same ratio of area to volume as used in the room will be satisfactory for galleries or towers, provided the venting area is distributed evenly.

To determine if outside glazing would permit glass to be blown out at a pressure below that required for breaking, the steel sash was reversed. With the glass held in the frames with clips only, the average pressure at which glass was blown was about 50 lb. per sq.ft. Plastic putty of a standard type with four auxiliary clips was similarly tested. With this glaze, 100 lb. per sq.ft. was required to blow out the glass. In like manner, commercial putty (whiting and linseed oil) with four clips per pane was tested after a few days of aging. This withstood a pressure of about 200 lb. per sq.ft., or double that for plastic putty. Considerable added resistance is anticipated when glazing with commercial putty is tested from six months to a year after installation.

These results indicate that outside glazing with plastic putty has certain advantages. Outside glazing, however, probably would be more difficult and more expensive, and replacement of broken panes would be more hazardous, particularly on high buildings.

Another method suggested for reducing the pressure at which fixed glass would break was to score the pane in such a way that comparatively low pressures would fracture the glass. From the few tests (Fig. 3) it was concluded that this method had some merit. Although the depth and design of the cut affect the breaking strength of scored glass, it is believed that such cuts will permit glass to be blown out at from one-half to one-third the pressure normally required to break it.

It should be understood that scoring is not recommended as a substitute for movable vents but rather as additional protection. Information is not available concerning the possibility of fractures due to extreme or sudden changes in temperature or to building vibration, but no breakage from this cause occurred during the tests.

Much remains to be done in the experimental work on venting. Many of the studies have not been completed, and experimental work with other dusts will be necessary. A study of flame travel during dust explosions and a series of tests with deep bins or vaults is desirable. The heavy losses of life and property already caused by dust explosions are an incentive to carry on work which will aid in reducing or eliminating this hazard.

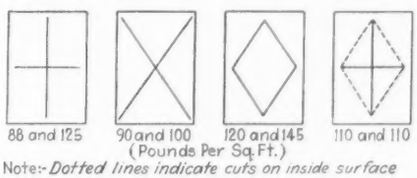


Fig. 3—Breaking strength of scored glass

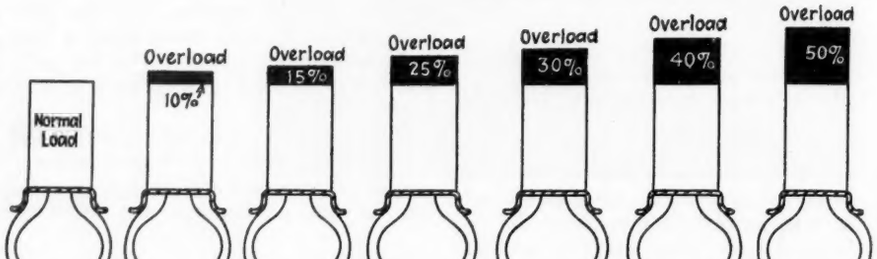
Reducing Tire Expenses by Proper

Individual Tire Card Is Key of Control System—Selection, Overloading and Inflation Are Factors Affecting Mileage

PNEUMATIC tire expense in large motor-truck fleets can be greatly reduced by maintaining individual tire records and by setting up a control system covering tire selection, inspection, and maintenance against all forms of tire abuse. In the vernacular of the fleet owner, this is quite a "mouthful," yet, in actual practice, the work is simple in its fundamentals. It requires the application of certain rudimentary engineering principles in the beginning, after which its successful conclusion is dependent more than anything else upon patience and a continuous attention to details.

Tire manufacturers are today building more mileage into their tires than ever before. Low tire costs are dependent upon the fleet owners getting that mileage out of their tires. This greater built-in mileage has been due to continuous research and improvement.

Because tire expense, next to fuel cost, is the largest single item of truck-operating expense, continuous effort should be maintained to reduce it. Any fleet owner in the field of the food industries who is not able to reduce his tire cost per mile, will find it is due to one or a combination of the factors of improper selection; lack of proper inspection system to prevent overloading or inflation; or to inattention to minor details of the care brought about by imperfections in truck maintenance. These include wheel misalignment or brake misadjustment, or running operations, such as bottle cuts, curb-scuffing, car-track riding, too tight anti-skid chains, etc.



A pictorial representation prepared by the United States Tire Co. to show the effect of overloading on tire mileage. Note that a tire overloaded 50 per cent can be expected to render only 45 per cent of its normal service.

In reducing tire expense the first important requisite for the fleet owner is to be certain that he has selected the proper size of tire for each type of truck under consideration. This sounds easy enough, yet tire-overloading is perhaps the chief cause of reduced tire mileage.

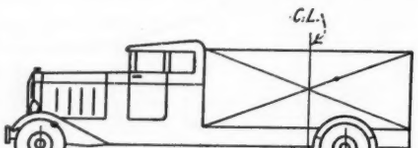
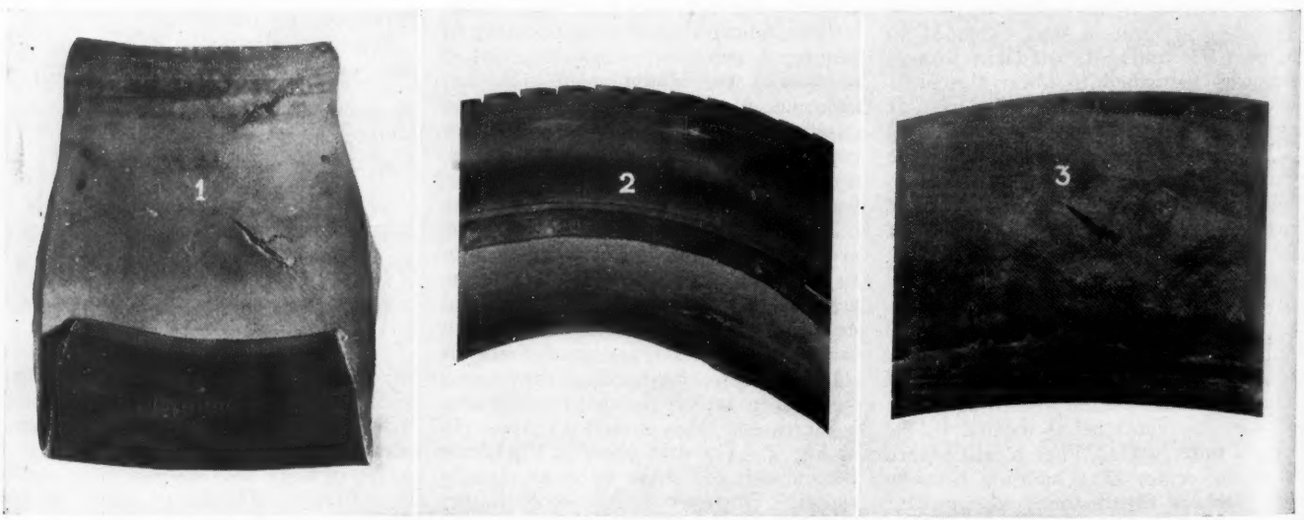


Diagram prepared by the Dayton Rubber Mfg. Co. to indicate method of calculating the amount of the pay-load carried by the tires on front and rear axles.

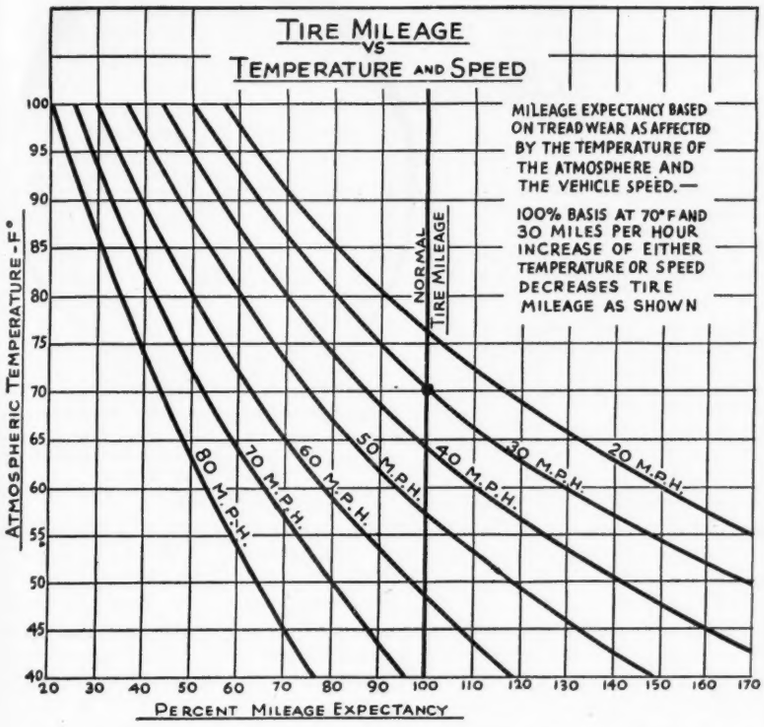
Overloading results from many causes. In some cases it may be due to the truck manufacturer equipping his trucks with tires just large enough to carry the truck's rated capacity in order to reduce the initial price of the truck. Then, if the truck is overloaded by its owner, the tires are immediately overloaded and will not give their maximum service.

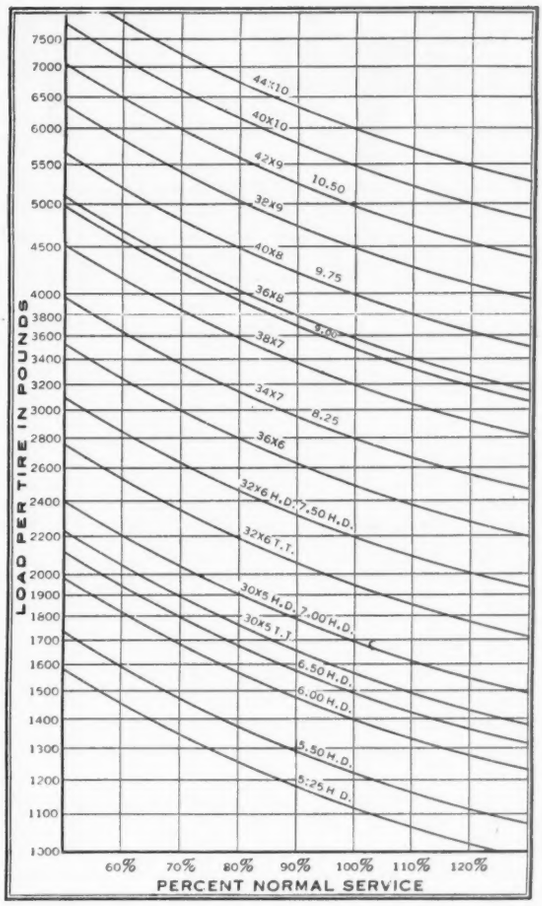
Some fleet owners, whose trucks go out loaded and come back empty, seek to justify the overloading on the outward portion of the trip as balancing off underloading on the return portion. This is a fallacy which results in re-



Results of tire abuse on Silvertown tires made by the B. F. Goodrich Rubber Co. No. 1 shows a fabric break caused by excessive flexing and excessive heat produced by overloading or underinflation. No. 2 shows another result of underinflation or overloading. Note the side-wall break and rubber scuffed off at the shoulder of the tire. No. 3 shows a blowout resulting from the failure to repair a tread cut. The plies were torn by the sudden release of the air.

Control and Maintenance Methods


TIRE MILEAGE
VS
TEMPERATURE AND SPEED
MILEAGE EXPECTANCY BASED ON TREAD WEAR AS AFFECTED BY THE TEMPERATURE OF THE ATMOSPHERE AND THE VEHICLE SPEED.—
100% BASIS AT 70° F AND 30 MILES PER HOUR
INCREASE OF EITHER TEMPERATURE OR SPEED DECREASES TIRE MILEAGE AS SHOWN
NORMAL TIRE MILEAGE
ATMOSPHERIC TEMPERATURE - F°
PERCENT MILEAGE EXPECTANCY
20 M.P.H.
30 M.P.H.
40 M.P.H.
50 M.P.H.
60 M.P.H.
70 M.P.H.
80 M.P.H.

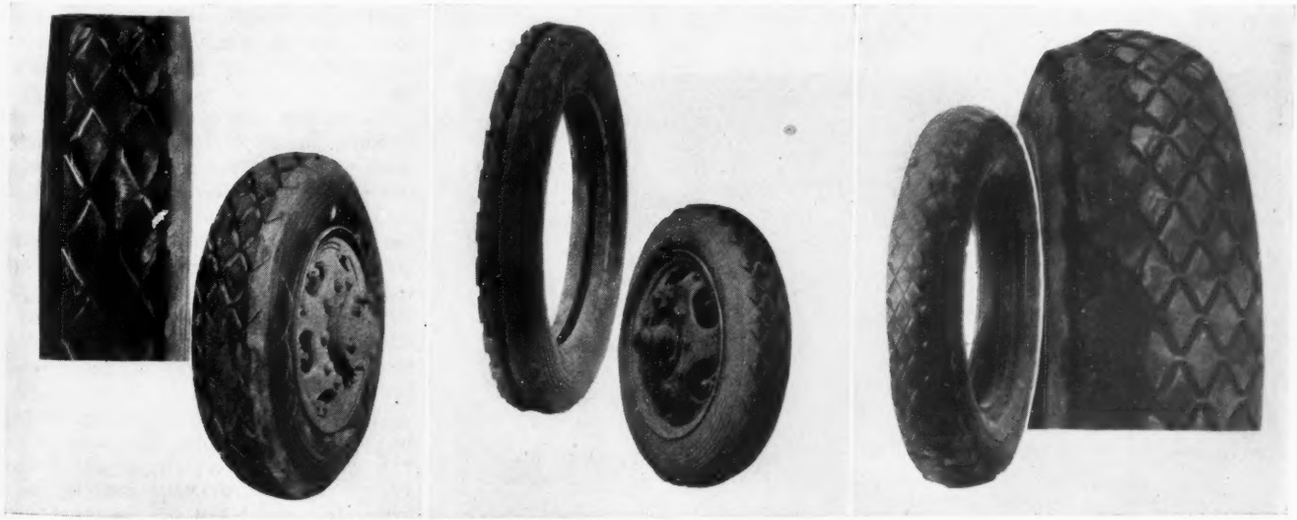


Above, a United States Tire Co. chart showing the effect of temperature and speed on tire wear. At right, a Firestone chart showing tire loads by sizes and effects of overloading.

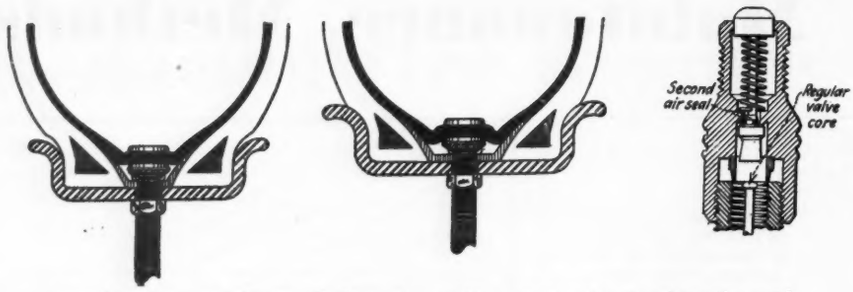
duced mileage delivered, because tire-carrying capacities, as stated by the tire makers, are maximums with no factor of safety. Hence any overloading subjects the tire to excessive strain, which tends to reduce the tire life and, therefore, to increase the cost per mile delivered.

In other words, the truck owner pays for the proper size of tire whether he buys it or not. If he selects a tire which is too small, he gets a low initial tire price and a high cost per tire-mile. If he selects the proper size of tire, the initially higher tire price is more than offset by the reduced cost per mile, to say nothing of the greater truck-cushioning provided and the greater freedom from repairs and road changes. Most fleet owners have discovered it is more economical to oversize than to undersize tires.

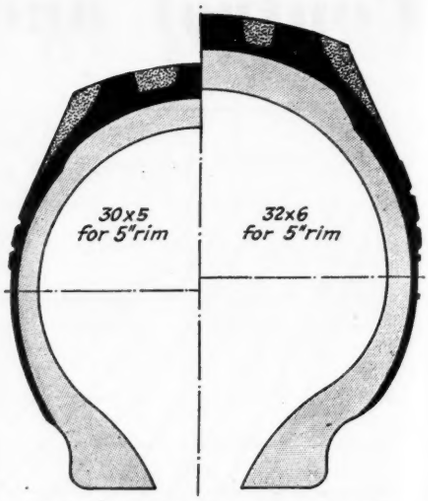
Vehicle speeds and atmospheric tem-



Reading from left to right are shown Goodyear tires subjected to usual forms of tire abuse. At the extreme left is shown the result of unequalized brakes. Next is shown the result of a single severe brake application. Then comes the final stage of wheel misalignment, and after that, misalignment in its early stages. Next is shown front-wheel-tire wear due to excessive camber; and at the extreme right, rear-wheel-tire wear due to misalignment. All these abuses can be eliminated.



Drawings prepared by the Rubber Association of America to show tire and rim fits. At the left is shown a tire mounted on too small a rim. Note improper valve base seat and excessive stresses on the valve pad of the inner tube. In the center, a correct rim fit. At the right, the Schrader Dublchek valve cap, which assists in maintaining proper inflation pressures.



A special Dayton 32x6 tire designed to seat properly on a 5-in. rim. The 32x6 tire has 250 lb. more carrying capacity than a 30x5 tire.

peratures also affect the service obtained from tires, as shown in one of the accompanying tables. These factors should be considered in the selection of tires. On overland hauls at sustained high speeds, balloon tires have become increasingly popular, because of cooler operation and lower inflation pressures. Other advantages include easier riding; greater cushioning or less impacts to the truck itself; and greater road traction.

Balloon Tires Increasing

The trend in new truck design is definitely toward the increased use of balloon tires. The substitution of balloon tires for high-pressure tires on existing truck equipment sometimes presents difficulties which can be overcome only at considerable expense. These include rim or wheel changes; front axle steering interference; and insufficient fender- and wheel-housing clearance.

In determining whether existing trucks are fitted with proper size of tires, the total weights carried on the front and rear axles of the trucks when loaded must be determined. This can be done most conveniently by actually weighing separately the front and rear ends of the loaded truck on a platform scale such as used in coal yards. The recorded weight on the front axle divided by two will give the load carried on each front tire. If the rear axle carries two single tires or four dual tires, the weight on the rear axle divided by two or four, respectively, will give the load carried on each rear tire. If the tire loads so determined are greater than those recommended by the tire maker for the size of tire used, the tires are overloaded and are too small to give the maximum tire service.

In specifying the size and type of tires on new trucks, tire loads usually are determined in two steps. The first step covers the chassis and cab weight carried on the front and rear axles. This is furnished by the truck manufacturer. The second step is to proportion the weight of the body and pay-load to the two axles and add these weights to the chassis and cab weight to give the total axle weight of the vehicle when in service.

Because of the conventional type of truck, the body and load is more nearly over the rear axle than the front axle. To determine what that percentage is in each case, it is necessary to find that point at which the entire weight could be concentrated and have the same effect on the chassis as the actual body and load. That point is technically known as the center of gravity of the body and payload. With uniform body loading, it is at one-half the body length.

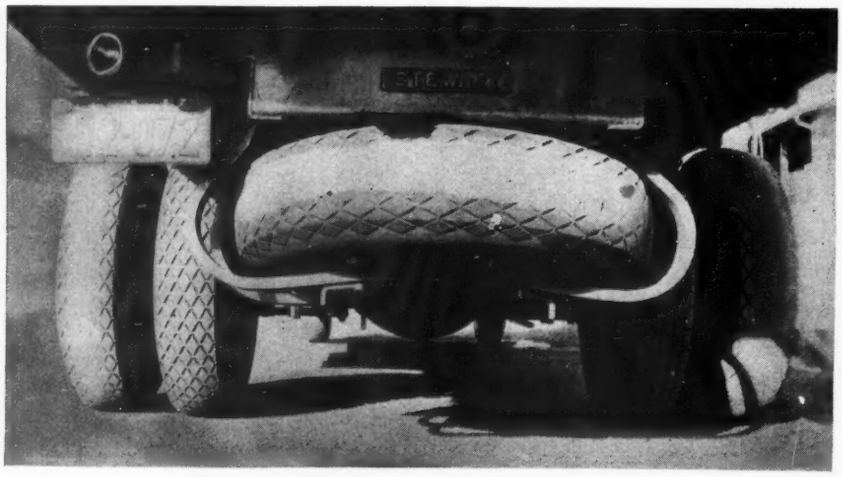
Referring now to the small drawing on page 180, the proportion of body and payload weight carried on the rear axle is obtained by multiplying that weight in pounds by the distance *R* in inches and dividing that by the total distance *WB* in inches. This quotient added to the empty rear axle weight will give the total rear axle load. Dividing this total by two for single tires, or four for dual tires, will give the individual tire load.

Weight Distribution Important

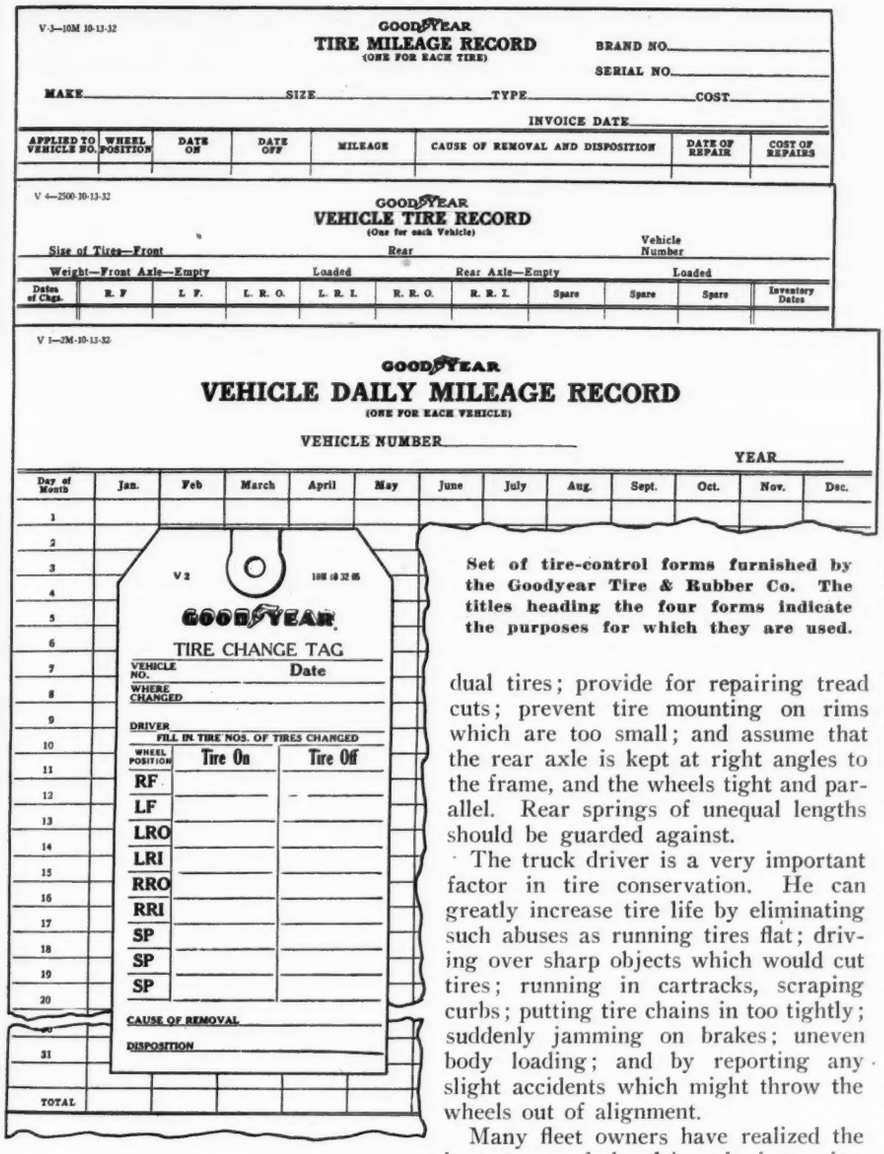
Similarly, the percentage of the body and the pay-load weight carried on the front axle is the total body and pay-load weights, minus that carried on the rear axle, or the distance, *F*, in inches multiplied by the body payload weight in pounds divided by the distance, *WB*, in inches. This weight added to the empty front axle weight will give the total front axle weight, which, divided by two, will give the load on each front tire.

All of the above detail is important because, due to the possible total weight distribution of the conventional truck, the load carried on each rear tire is greater than that on each front tire. If the same size of tire is used on the front and rear axles, in order to have one spare tire serve as a replacement for all tires, the larger load carried on each rear tire is the determining factor as to size. The front tires are thus underloaded.

It is, therefore, incorrect to attempt to calculate the proper tire size by dividing the gross weight of the loaded vehicle by the carrying capacity of a given tire multiplied by the number of such tires used. This might indicate a tire considerably underloaded on the front axle and greatly overloaded on the rear axle.



Rear of truck showing mismatched dual rear tires with the worn tires on the outside instead of the inside in each case. On account of the road crown and the larger diameter of the new tires, the latter carry a larger percentage of the load than the outside duals.



Set of tire-control forms furnished by the Goodyear Tire & Rubber Co. The titles heading the four forms indicate the purposes for which they are used.

It should be noticed that the carrying capacities of each tire, as given by all tire makers, also gives a corresponding proper inflation pressure. And so, after the proper size has been selected to carry the load, it is highly important that its proper inflation pressure be maintained in service.

It is the air inside the tire which carries the load. The tire itself merely is a container. Hence underinflation is just as detrimental to long tire life as overloading.

Place Inflation Responsibility

In fleet operation it is necessary for the fleet owner to establish definitely responsibility for maintaining proper inflation pressures and to require that tires be gaged at least once a week, or more often if necessary. The Schrader Dublchek valve cap will assist in maintaining proper pressures.

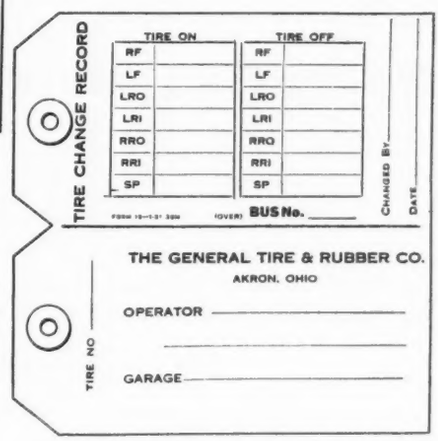
The truck owner's maintenance system should be such as to correct wheel misalignment and brake misadjustment. It should also prevent mismatching of dual tires; provide for repairing tread cuts; prevent tire mounting on rims which are too small; and assume that the rear axle is kept at right angles to the frame, and the wheels tight and parallel. Rear springs of unequal lengths should be guarded against.

The truck driver is a very important factor in tire conservation. He can greatly increase tire life by eliminating such abuses as running tires flat; driving over sharp objects which would cut tires; running in cartracks, scraping curbs; putting tire chains in too tightly; suddenly jamming on brakes; uneven body loading; and by reporting any slight accidents which might throw the wheels out of alignment.

Many fleet owners have realized the importance of the driver in increasing tire life. Some have devised bonus systems in which drivers are awarded a cash allowance for all tires which exceed a certain mileage.

The average careful driver can bring his truck to a stop before any visible injury is done to the tire in case of a puncture or blowout when traveling at reasonable speeds. Flat tires on dual rear wheels or on trailers are more difficult to detect while in motion. Electrical devices are now being developed to warn the driver in such cases.

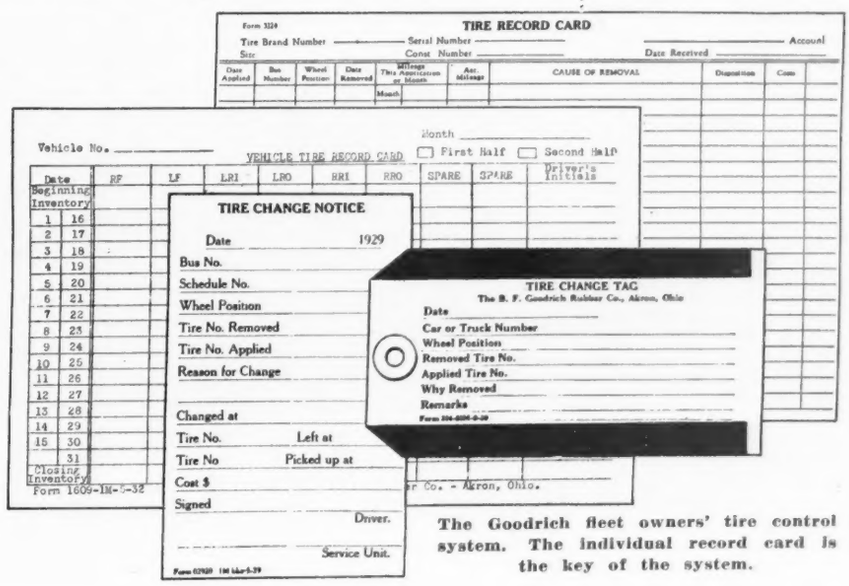
Slippage is the most important cause of tread wear. Laboratory tests have shown less wear after 3,000 miles without slippage than a few hundred feet with slippage. Hence drivers should be instructed to start and stop with uniform acceleration and deceleration. A good rule is to coast to stops whenever possible.



Front and reverse side of the tire-change record tag supplied by the General Tire & Rubber Co. The tag is suitable for bus or conventional truck-tire changes.

The driver can also help to increase tire life by loading his truck uniformly. This will prevent the proper size of tires from being grossly overloaded by uneven load distribution.

If the proper tire has been selected, proper inflation pressures assumed, and mechanical and driver care provided, the next step is to provide some form



The Goodrich fleet owners' tire control system. The individual record card is the key of the system.

of record to establish the fact that the built-in mileage has been delivered and to show what reduction in tire expense has been obtained. The forms of several such systems are shown on these pages.

The key form is the individual tire-record card. These may be filed in four groups, including: (1) Active, for tires and vehicle wheels and spares; (2) Repair, for tires being repaired; (3) Stock, for all tires in stock; (4) Dead, for tires worn out and discarded.

The individual tire card definitely establishes the mileage run and the cost of the tire service delivered. It also serves as the basis of adjustment between owner and tire supplier. A worn-out tire should never be disposed of until the tire card has established the actual mileage run.

Stipulated Adjustment Basis

The fleet owner should stipulate an adjustment basis on the purchase price or on the price existing at the time the adjustment is made. It is beneficial for the fleet owner to adjust on the purchase price, if the trend of prices is downward, or on the existing price, if the trend is upward.

A study of the tire cards grouped according to size provides an average cost per tire-mile for charging into the truck operation costs. A further study of the cards of worn-out tires, by size and make, enables the fleet owner to determine which make is the most economical to buy. By assuring the economy of each individual tire, the total tire saving will take care of itself, since it is composed of the aggregate of all individual tire savings.

Operating Motor Trucks in the Food Industries

• This regular department, reduced in size to make room for the preceding important feature article telling how to save money in the control and care of tires, will be at its full length in our June issue. Watch for timely data on fundamental phases of motor-truck transportation. Our readers' views are cordially solicited for discussion in these pages or by correspondence.

Restrictive Truck Legislation Developing New Vehicle Types

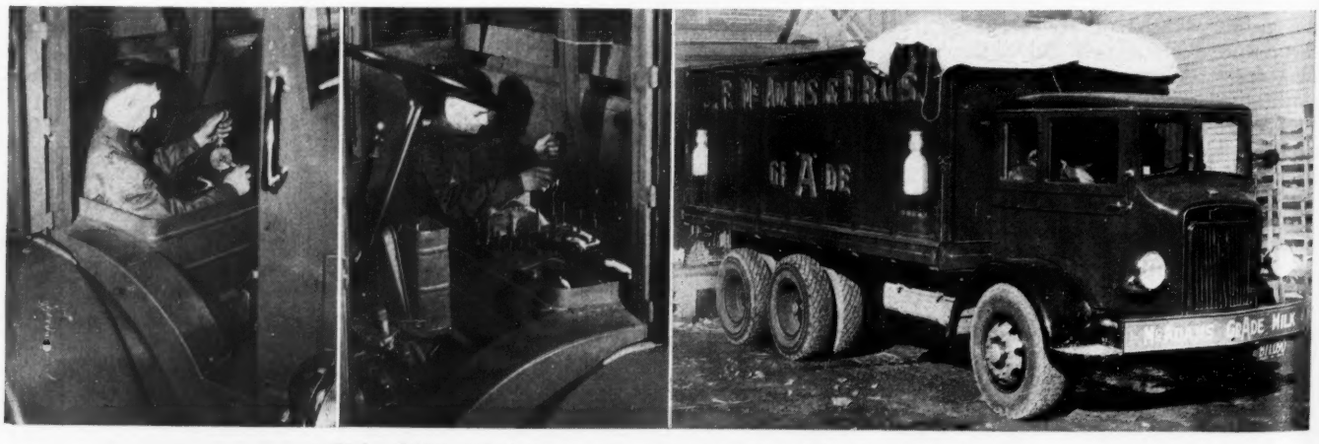
RECENT motor-truck legislation enacted in many states has restricted gross vehicle weights, axle loads and over-all lengths. In these and other states, the truck user has not been able to take advantage of the allowable gross vehicle weight because of the axle-load limitation and the inability to carry sufficient weight on the front axle of the conventional truck with its engine out in front under a hood.

On such conventional trucks, the position of the body and load relative to the cab engine and front axle is such that, while the rear axle can be loaded to the legal limit, less than half that weight can possibly be carried on the front axle. Hence the combined front axle weight and the limit of weight on the rear axle is still much less than the total allowable gross weight.

Transportation engineers studying the problem have pointed out that its solution lies in the development of some design of truck with the gross weight more evenly distributed over the front and rear axles. With greater loads carried on the front axle the need to reduce driver fatigue may necessitate power steer, as already employed on some motor buses.

Of interest to truck users in the food field who have to solve such problems, the indicated trend in future truck design is well exemplified in the new line of engine-under-the-seat trucks recently brought out by the Autocar Co., Ardmore, Pa., and illustrated below.

While the Autocar Co. has had more than 25 years' experience in manufacturing that type of vehicle, its new line of U-type trucks is featured by a new design of cab, roomy and well ventilated for the driver, and with the engine so located as to be more conveniently accessible for inspection and maintenance than is the case with many engines under hoods flanked on either side by wide fenders over large balloon tires. Each model in the U line retains its inherent advantages of greater front-axle loads and short wheelbase and over-all lengths.



New Line of Autocar Engine-Under-the-Seat Trucks

Three views of one of the new line of Type U Autocar engine-under-the-seat trucks featured by a new de luxe cab; short wheelbase for body length and a greater proportion of the total load carried on the front axle. At the right is shown a model UTE Autocar used in milk haulage in Chelsea, Mass. It has a wheelbase of 131 in. and abody length of 210 in. At the left is a view taken through the right door of the cab, showing a mechanic standing on the floor between the truck frame and the fender and grinding one of the engine valves. In the center is a view taken through the opposite or left door of the cab, showing the accessibility of the engine for the mechanic working on the rear valve seats.

If Screw Cap Sticks How Does a Woman Open the Container?

(Concluded from page 171)

ready technique for getting around this difficulty. It is also evident that this technique is not always successful and that as a result some containers cannot be opened by them. Upon the basis of tests made, the opening methods employed by housewives, other than the use of their unaided hands, may be summarized as follows:

1. Forty out of one hundred women may be expected to attempt to remove a sticking cap by hitting its edge with a knife or other tool.
2. Twenty-five out of one hundred by hitting it on the floor or on a table.
3. Nine out of one hundred by placing it in hot water.
4. Six out of one hundred by using a knife or can opener to pry under the cap.
5. One to four out of one hundred by one of several methods, such as using a towel to grip it, using pliers, heating with a gas flame, using some special device designed for the purpose, or by any other method that the occasion may offer.

The other point observed in these kitchen tests was the total time required for removing or attempting to remove each cap. Average figures for the 500 tests were as follows:

Size and Design of Cap	Average Time in Seconds
28-mm. rolled-on screw caps	4.1
28-mm. preformed screw caps	26.4
63-mm. rolled-on screw caps	4.0
63-mm. preformed screw caps	39.7

Reviewing the whole series of tests discussed in the three articles of this series, certain conclusions may be drawn:

1. Women are definitely limited as to the twisting effort that they can exert in removing a screw cap from a container.
2. By mechanical tests, many screw caps picked up in the trade are shown to require more twisting effort for removal than even a strong woman can exert.
3. When a woman is faced with a sticking cap which she cannot remove by means of her unaided hands, she has learned to employ one or more of several rough-and-ready methods developed by experience.
4. Even by the aid of these methods, women are not able to remove all of the sticking caps that prove to be beyond the strength of their unaided hands.
5. Design of cap is an important factor in ease of opening screw caps; and, by choice of design, trouble from sticking caps can be greatly reduced.

BOOK REVIEWS

100,000,000 Guinea Pigs. By Arthur Kallet and F. J. Schlink, Consumers Research, Inc. Published by Vanguard Press, 100 Fifth Ave., New York, N. Y., 1932, 312 pp., 7½x5; cloth. Price, $2.

ABOUT every generation or so, there arises a reformer who is so insistent that he dares to risk his own economic future by bringing to the printed page the name and practices of those who incur his displeasure. Along about 1900, our souls were harrowed by Upton Sinclair when he published his novel "The Jungle." That book as we recall it was about 90 per cent social criticism and perhaps 10 per cent of it was an indictment of the packing industry of that day. Whether it brought about the formation of the Bureau of Animal Industry inspection service or not is a debatable question, yet it is a matter of history that B.A.I. inspection came into being shortly afterward.

Mr. Sinclair, now a resident of sunny California, probably will experience a sense of elation that Messrs. Kallet and Schlink have embarked upon a crusade which, so far, has apparently out-Sinclaired Upton Sinclair. Perhaps their indictment of many a well-known firm and product—for they really do speak out in school—will serve a real good, although this too is debatable, for they have worked the fear motive almost too strenuously.

At any rate, the Federal Food and Drug Law of 1906 is now being dusted off and overhauled, prior to the advent of summer, and if the revision of the law should be patterned along the lines proposed by "100,000,000 G.Pigs," it is easy to foresee that the market for food chemists is going to be strong and the budget of the Food and Drug Administration as well as the Food Research Division of the Bureau of Chemistry and Soils will be greatly augmented instead of curtailed. However, they propose to take these two bureaus away from the Department of Agriculture and set up a new Department of Public Health and Health Education.

Since both of the authors declare themselves to be engineers, it seems improbable that they ever served under the grand old irreconciliable, Dr. Harvey W. Wiley, yet they have been imbued with his late zeal to administer chastisement. Not content, they, to utilize less drastic methods of accomplishment of reform than boiling in oil, even for the most trivial violations of the existing law. One does not condone the crimes of which they complain, but neither can one subscribe to the philosophy of their zeal in demanding excoriation for lesser violation.

It is suggested that the authors associate themselves with a good bacteriologist and biological chemist—one of wide, non-pathological as well as pathological training. Such an associate would tend to temper some of their vindictiveness anent pie fillings, starch, pectins, egg products, dextrose, and many other perfectly good foods without in any way impairing their crusade against real evils.—L. V. Burton.

The Microbiology of Foods. By F. W. Tanner, Head of Bacteriology Department, University of Illinois. Published by Twin City Printing Co., Champaign, Ill., 1932. 768 pp., 6¼x9¼; cloth. Price, $7.50.

KNOWLEDGE concerning the action of microorganisms on foods and food substances has been accumulating ever since the days of the historic quarrels between Liebig, the chemist, and Pasteur, the chemist-microbiologist. Until Pasteur published the results of his studies on the diseases of wine, no serious attempt had been made to explain or to control the changes which took place in food through what is now known to be the activity of microorganisms.

When properly directed, these changes will result in the preservation or the transformation of the food so as add to its economic and to its gastronomic value. When technically trained direction is lacking or improperly applied, these changes may result in an economic waste of the food through deterioration. In many instances the food material may, through the deteriorative action of microorganisms, not only be rendered unfit for human consumption but may actually become injurious to the health of anyone who might handle or attempt to eat it.

These factors and many others are dealt with in this book by the author, who has drawn upon his many years of experience as a teacher and research worker in food technology at the University of Illinois and as consultant to food manufacturing concerns. Many references are made to technical and government literature so as to give the reader the benefit of the experience of other workers whose studies have recived recognition. The sources are cited at the bottom of each page and microbiologic identification is given to each organism designated. Such consideration for the reader adds much to the value of the book for reference purposes.

Practically a third of the book deals with the microbiology of milk and other dairy products. In most instances only a single chapter is devoted to the various food products, ranging from fresh fruits to such miscellaneous foodstuffs as olive oil, cocoa and coconut fats, and carbonated beverages. In all there are 25 chapters in the book. Eleven of them deal with non-dairy foods. There also is a chapter devoted to water and sewage.

Laboratory or classroom discussion of the various microorganisms and culture media are included to make the book a valuable reference volume for the laboratory technician as well as for the technically minded production man. The eleven-page index could be improved upon by having more cross-indexing.—E. S. Stateler.

NEW PRODUCTS
NEW METHODS

Sulphur Dioxide Keeps Figs

Recent experiments at the Texas Agricultural Experiment Station have pointed out that Texas magnolia figs can be preserved for many months in dilute solutions of sulphur dioxide and that the keeping time to a great extent depends upon the concentration of the solution. Figs preserved by this method are excellent in appearance and remain firm in texture, even after several months, Harold M. Reed, horticulturist at the station, reports.

The greatest possibility of this method of preserving figs seems to lie in the bulk shipment of the raw product to foreign countries, where it is made up into the finished product. However, it may prove just as useful for domestic shipments and manufacturing purposes.

Sulphur dioxide has been used in the fruit industry as a preservative for a number of years, notable examples of its use being in the dried-fruit industry and as a holding solution for such fruits as cherries.

Lime-Mix for Cocktails

By combining the juice of fresh limes with pure cane sugar, California Fruit Juice Co., Ltd., San Francisco, has produced a bottled "Lime-Mix" to take the place of fresh juice in the recipes for "pick-up" beverages. The product is a cold-pack syrup blended in the proportions required to give a relative sugar and acid content satisfactory for gin fizzes. The Lime-Mix is packaged in a green bottle with a modernistic label and a transparent wrapping. In addition to Lime-Mix, the California Fruit Juice Co. produces the companion items Orange-Mix and Lemon-Mix. A circular containing a number of recipes for favorite drinks is used to promote acceptance of the products.

To eliminate hand burring in extracting the juice for these mixes, the company uses a new automatic juice extractor. The fruit and juice do not come into contact with the human hand at any time after the fruit has been cut open.

Jar With Coaster for Cap

Attractive design and a triple re-use value are incorporated in the new de luxe one-pound preserve jar adopted by American Preserve Co., Philadelphia, Pa. The jar has a wide mouth which will permit insertion of a tablespoon and it is provided with a reclosure that adapts it to table use for other products. The cap used for reclosing is made of glass and is attached by a brass clip to the metal cap with which the jar is sealed. This glass top serves as a coaster or ash tray.

Rite-A-Name Candy Eggs

In response to the demand for novel confectionery packages for the children on Easter, Elmer Candy Co., Inc., New Orleans, introduced a "Rite-A-Name" package of candy eggs. This comprised three undecorated chocolate eggs and a tube of white icing, packed in box with windows to display each unit of the set. The box was colored green and lettered in red. A transparent cellulose wrapping protected the contents. This package found favor with the children since it enabled them to decorate the eggs with names and designs of their own choosing.

Acid Retards Rancidity

By the addition of maleic acid, oxidation of fats and oils can be inhibited and the development of rancidity retarded by an appreciable amount. In tests made by the discoverer of the process, George R. Greenbank, one part of maleic acid added to 10,000 parts of oil retarded rancidity for 47 days in the case of butter, 37 days with peanut oil and 28 days with cottonseed oil. Other retarders were used successfully, but none approached the efficiency of maleic acid.

This process is covered in U. S. Patent No. 1,898,363, which is dedicated to the free use of the public and the government.

Force and Sunny Jim Return

"Force," the first of the cold cereals, with its Sunny Jim, famous old advertising character, has been revived by Hecker H-O Co., Inc. This old-time wheat-flake cereal has been improved, and a revolutionary idea in packaging plus a vigorous sales campaign is expected to put it back on the breakfast table in short order.

The packages of Force constitute their own display. They are made up in a series of five different designs, each showing the figure of Sunny Jim in a different stage of motion. The complete series gives the exhilarating motion effect of Sunny Jim jumping a high hurdle. All printed matter on the package is in jingle form, reminiscent of the rhymes used 30 years ago to introduce Force. Even the recipes and list of ingredients are rhymes.

Many Adopt "Visible" Vacuum

Vacuum packing in glass would seem to be popular with coffee roasters. Although that method of packing is relatively new, it has been adopted for several brands of coffee, as is indicated by the illustration.

Roasters who are packing in glass believe their product has more consumer

appeal. They point to the natural attractiveness of the glass container, to its re-use value in the home and to the opportunity which it affords for individualizing the package through special designs. This appeal has recently been strengthened by the introduction of a one-piece screw cap with a groove in the top that permits a knife to be used as a lever to open the container. This is the creation of Owens-Illinois Glass Co.

Flavored Cream Spread

Cream in a different form has been introduced by the small Prospect Street Dairy, Midland Park, N. J. By means of a special De Laval cream separator, this dairy is producing a pure sweet cream of such thickness that it is almost solid, and it is adding to this product pure strained honey or shredded Hawaiian pineapple to produce Delshire Cream Spread.

When the cream comes from the separator it is said to be twice as thick as the heaviest of whipping creams, containing 80 per cent fat. Except for adding the honey or the pineapple, the dairy puts the cream under no processing. The product is neither cooked nor aged.

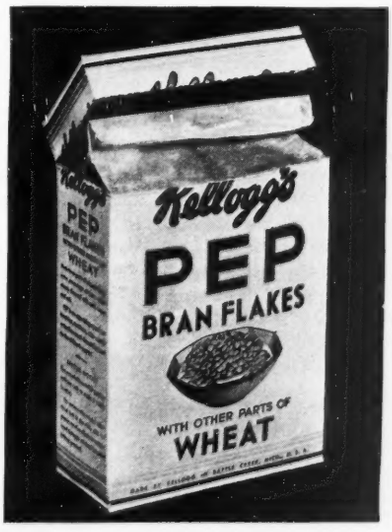
Delshire Cream Spread spreads smoothly and is used on crackers as a sandwich filler, on waffles, pancakes or hot breads.

Easy-Open Kellogg Package

Something quite clever in a practical way has been developed by Kellogg Co., Battle Creek, Mich., in its new line of easy-opening, easy-reclosing cereal packages. The cartons are perforated along the front and sides near the top, and a slight pressure of the thumb along the perforated line breaks the container and

permits the top to hinge on the back side. Inside this container is a patented Waxtite inner-seal bag sealed at the top by folding over and stamping. This bag opens without tearing, and it may be reclosed to keep the cereal fresh by folding the top.

The artistic design of the new packages has been changed to make it more modern, but it retains the well-established Kellogg



signature and colors: dark green, red and light green. The shipping case also has been redesigned so that it is in harmony with the style of the package.

The Kellogg products being packaged in the new containers include Corn Flakes, Pep Bran Flakes, All-Bran, Rice Krispies, Krumbles, Whole Wheat Biscuits and Whole Wheat Flakes.

Dromedary Family Complete

Its economy and sales appeal qualities having been proved, "family" design in packages is becoming popular among the larger food manufacturers. A striking example of this type of package design is seen in the Dromedary products of Hills Bros. Co., New York. With its new coconut package and can, that company has completed its program of package redesign, a change-over made gradually over a period of two years.

In presenting the packages and containers, the artist has retained the original color scheme of yellow, brown and red, chosen a quarter of a century ago. However, the new packages are of a more brilliant yellow, with less brown and more red coloring. Flashes of bright blue have been added to the grapefruit and coconut packages. The new design is simple and distinctive and yet has a snappy effect.

Pineapple-Flavored Gelatin

Pineapple-flavored gelatin has been added to the Royal line of "quick-setting" desserts made by Standard Brands, Inc., New York. The new dessert is produced

by mixing pure gelatin with sugar, fruit acid and coloring. It is put up in 3½-oz. packages. The formula is said to "seal in" the flavor.

Six other pure fruit-flavored gelatins are included in the Royal family of desserts: strawberry, raspberry, cherry, orange, lemon and lime. With the two puddings, vanilla and chocolate, there are now nine Royal packages.

THIS MONTH—

MAY

8-10—Southern Bakers' Association, annual meeting, Hollywood Beach Hotel, Hollywood Beach, Fla. Thomas C. Hull, secretary, 191 Whitehall St., S.W., Atlanta, Ga.

9-10—American Spice Trade Association, annual meeting, Waldorf-Astoria, New York, N. Y. N. W. Ericson, secretary.

9-11—American Wholesale Grocers' Association, annual meeting and exhibit, Peabody Hotel, Memphis, Tenn. R. H. Rowe, secretary, 900 Investment Bldg., Washington, D. C.

11-12—Glass Container Association of America, annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Victor L. Hall, secretary, 19 West 44th St., New York, N. Y.

12—National Malt Products Manufacturers' Association, quarterly meeting, New York, N. Y. S. L. Goldman, secretary, 160 North La Salle St., Chicago, Ill.

15-16—National Cottonseed Products Association, Roosevelt Hotel, New Orleans, La. S. M. Harmon, secretary, 1913 Sterick Bldg., Memphis, Tenn.

22-23—National Federated Flour Clubs, annual meeting, Gibson Hotel, Cincinnati, Ohio.

25-27—Rice Millers' Association, annual meeting, Galveston, Texas. W. M. Reid, secretary, 1101 Queen and Crescent Bldg., New Orleans, La.

Hors d'Oeuvres

A NON-SKID spaghetti with a corkscrew twist has been invented by Victoria Fusilli Co. The manufacturer guarantees it not to slip off your fork and park on your tie.

•

WHEN we glanced at the advertisement captioned "New York and Pacific Hops" we wondered about the fare on these coast-to-coast trips. Then it dawned upon us that the "hops" referred to were a new commercial product introduced April 7.

•

SOMEONE is always spoiling the fun for the kiddies. And now a prominent Chicago feed concern comes out with a special diet that causes hens to lay dyed-in-the-shell eggs for Easter.

•

SOME enterprising mathematician has calculated that if all the pretzels to be consumed in the coming year were linked together the chain would reach ten times around the earth. Now will someone figure out how wide the canals of Mars would have to be if they were supplying beer instead of irrigation water.

•

A MAN-KILLING ghost stalked the abandoned Lanzer brewery in Brooklyn in 1883, so people said, and Gottfried Piel found the owners willing to sell for a pittance. Piel didn't believe in ghosts and he thought American beer was terrible, so he bought the place and began the manufacture of beer a la his native German style. Few modern breweries can boast such a spiritual history.

What Food Men Are

Food laws to be revised—Milk war Canners protest 30-hour week sugar tax up again—Say

FEDERAL FOOD and Drug Regulations are in for a reshuffle as a part of the "new deal." No definite revisions have been announced, but it is evident from activities at Washington that many of the present regulations will be wiped out and new and more severe ones instituted. One of the changes which seems likely is provision for censorship of food advertising by the Department of Agriculture. A bill providing for this is being drafted. It is believed that, under the new program, the Secretary of Agriculture will be given power to investigate the accuracy of food advertising as well as to set standards for food products.

Associated Grocery Manufacturers of America, Inc., favors revision of the food laws. Its officers hold that weaknesses in the present law include failure to empower the administrative establishment of necessary legal definitions and standards of purity, failure to prevent the use of deceptively shaped and slack-filled food containers and failure to prevent false advertisement and false labeling.

Representatives of the trade met with R. G. Tugwell, Assistant Secretary of Agriculture, April 27-29, to discuss the pending changes.

DAIRY FARMERS broke through the lines during April on the two most important fronts in the nation-wide milk war. They secured definite price-fixing legislation in New York State and set the machinery in motion for similar legislation in the Northwest. More than that, they made a bid for national regulation.

After dumping many truckloads of milk, dairy farmers in the New York milk shed were pacified by the passage of a bill creating a board of milk control. The Pitcher bill, signed April 10 by Governor Lehman, provides for broad powers of regulation and the fixing of prices both to the consumer and the farmer, virtually making the New York dairy industry a public utility. Acting on the premise that its first objective should be "to put a bottom under the milk market," the board established minimum retail prices. For New York City, it set the price at 13 and 10 cents a quart, respectively, for grade A and grade B milk, delivered to the home. These prices are the same as had been charged by Borden and Sheffield Farms. Other prices are in proportion.

In Wisconsin, the trouble came to a climax early in April when Pet Milk Co. and Carnation Co., evaporated-milk producers, cut the price to farmers by 5 cents on 100 lb. And governors from five states, Wisconsin, Illinois, Indiana, Michigan and Iowa, met in Chicago during the second week of the month to confer on means of aiding the farmers and preventing the general strike planned to begin May 10. This conference asked Washington for aid and, pending passage of the farm relief bill, suggested the nation-wide adoption of a stabilization plan developed in Wisconsin. This plan provides for a committee authorized to fix prices to the farmer and allocate production among the dairies.

Ohio, too, is a storm center. The producers demand a minimum price, asking for 3½ cents a quart.

FARM RELIEF legislation at Washington during April caused much anxiety among food processors. However, one food industry — the canned milk producers—approved the bill, being heartily in favor of anything that might improve prices and conditions in the trouble-ridden dairy industry. A committee of canned-milk producers met with Secretary Wallace on April 10 to discuss the milk-price situation. Following the conference, William T. Nardin, Pet Milk Co., chairman of the committee representing the Evaporated Milk Association, said that the plan has been approved by the delegates as a means of quick and adequate relief.

The unmodified word "corn" in the relief measure brought protests from corn canners. With that wording, the bill would apply to canned corn, although no other canned vegetables are affected. Thomas Roberts & Co., Philadelphia brokers for more than 100 canners, sent a letter to the Pennsylvania senators at Washington asking that the wording be changed to "field corn" and stating that more than 50 per cent of the canners were financially unable to bear any additional burden.

Meat packers have always opposed legislation of this type, asserting that any increase in the price of meat would curtail consumption, promote the use of substitutes, and thereby injure both the farmer and the packer.

Millers likewise oppose such a measure. Fred J. Lingham, chairman, Millers' National Federation, issued a memorandum on April 1 which pictured the underlying theory of the farm bill as unsound and unworkable.

On April 20 the farm relief bill was virtually completed, but its heretofore

Doing and Saying

reaches climax—Farm relief bill—
—Fisheries face ruin—Cuban
lard is best shortening

rapid strides toward becoming a law were checked by the monetary expansion quarrel. However, the Senate passed the bill with the inflation amendment on April 28, and it was expected to become a law soon.

SENATOR BLACK'S 30-hour-week bill, which passed the Senate April 6, and its substitute, the Perkins bill, have added much to the worries of food manufacturers. The Black bill, which prohibits interstate shipment of goods produced by labor working more than six hours per day or over five days per week, specifically included canneries. Such restriction would, of course, be a serious handicap to the seasonal canning industry with its highly perishable products, and a strong protest was made. As a result, the Senate passed an amendment exempting canneries packing perishable farm products, including milk and milk products. But the Perkins bill specifies canneries.

Outside of industries dealing in perishables, opinion was divided on the efficacy of the 30-hour week. James F. Bell, president of General Mills, Inc., Minneapolis, stated that he did not believe in that type of legislation. He expressed the opinion that the enforced sharing of work would put an undue burden on those working people who can least afford to bear it.

INCREASED TARIFF protection for the New England fishing industry must be had at once or it may be sunk by foreign competition—this is the belief of Edward H. Cooley, manager of the Massachusetts Fisheries Association. More than 100 vessels of the Boston fleet of 500 were tied up on April 23 on account of profitless operation, and another 100 will cease their trips to the fishing grounds within a month unless relief materializes. The city dole for unemployed attracts many fishermen from the low wages available on the sea; commodity price declines have increased competition from meat and poultry; and depreciated foreign currencies have made it possible for producers in other lands to catch, pack and deliver fish to the United States at prices far below even the landing costs of American boats. Canada and Japan furnish most of this competition.

The New England group believe that to prevent bankruptcy they must obtain the protection of an equalization fee; defeat Canada's attempts to place sea foods on the free list; and obtain tariff increases.

CUBA'S SUGAR imports into the United States have again become a subject of discussion and negotiation at Washington. Early in April, American refiners urged the Tariff Commission to forward recommendation to President Roosevelt for an increase in the duty upon sugar. At the same time, Cuban representatives moved to obtain an increase of as much as 40 per cent in the present preferential duty on Cuban raw sugar as a palliative to the economic prostration which has followed the virtual collapse of the sugar industry in Cuba.

Domestic refiners reiterated their contention that the tariff on Cuban refined sugar, instead of protecting the domestic industry, actually provides a bounty to the Cuban refiners. They point out that the duty per pound for the refined sugar is actually less than the duty on the raw sugar required to produce a pound of refined sugar.

An allotment plan may be put into effect to solve the problem. The quota system under consideration would allocate 1,100,000 tons to American beet sugar, 200,000 tons to American cane sugar, 900,000 tons to Hawaiian sugar, 850,000 tons to Puerto Rican sugar and 2,000,000 tons to Cuban sugar. A quota system arranged for the Philippines, to become effective when the insular government takes the constitutional steps required by the independence act, permits 850,000 tons of sugar to enter this country duty-free.

MEAT PACKERS are at last putting up a vigorous battle for lard. For years lard has been losing to other shortenings, measured by relative retail prices, but now it has its own advocates. Institute of American Meat Packers has completed a series of laboratory tests from which the conclusion is drawn that lard has the highest shortening power of any plastic fat commonly used in cooking.

Shortometer breaking tests were conducted with pie crusts, 23,000 determinations being made. Using a crust made

Beer Cases Flow by Gravity

C. S. Schmidt & Sons, Inc., Philadelphia, are not only handling beer in a big way, but in a distinctly new way. This truck has the new Fitz Gibbon & Crisp wholesale case body, in which the cases are supported on racks equipped with rollers. The racks are pitched to the front and the cases "flow" into the body by gravity. To unload, the front of the body is raised by hydraulic power and the cases move to the rear.

—AND THE NEXT

JUNE

5-10—American Association of Cereal Chemists, annual meeting and exhibit, Medinah Athletic Club, Chicago, Ill. M. D. Mize, secretary, 833 Omaha Grain Exchange, Omaha, Neb.

5-10—Operative Millers' Association, annual meeting and exhibit, Hotel Sherman, Chicago, Ill. C. W. Partridge, secretary, 516 Board of Trade Building, Kansas City, Mo.

11-13—Certified Milk Producers' Association, joint meeting with American Association of Medical Milk Commissions, Milwaukee, Wis. Harris Moak, secretary, 360 Park Place, Brooklyn, N. Y.

19-21—National Macaroni Manufacturers' Association, Edgewater Beach Hotel, Chicago, Ill. M. J. Donna, secretary, Braidwood, Ill.

19-23—National Confectioners' Association, annual meeting and exhibit, Hotel Sherman, Chicago, Ill. Frank S. Records, secretary, 111 West Washington St., Chicago, Ill.

19-21—Association of U. S. Flavoring Extract Manufacturers, annual meeting, Chicago, Ill. L. K. Talmadge, secretary, Williams & Carleton Co., Hartford, Conn.

25-30—Sixth Midwest Engineering and Power Exposition, Coliseum, Chicago, Ill. G. E. Pfisterer, director, 308 West Washington St., Chicago.

26-29—American Dairy Science Association, University of Illinois, Urbana, Ill.

with 44 parts fat (by weight) to 100 parts pastry flour, the results were reported by the institute as follows:

Kind of Fat	Average Breaking Strength	Comparative Shortening Value
Refined lard	10.71	100
Vegetable stearine-vegetable oil compound	12.86	83
Hydrogenated lard	14.02	76
Hydrogenated cottonseed oil (No. 4)	14.23	75
Animal stearine-vegetable oil compound	14.30	75
Hydrogenated cottonseed oil (No. 6)	15.11	71

A series of tests in which different types of lard were used as shortening indicated that leaf lard has about 90 per cent as much shortening value as refined steam lard.

Another experiment favorable to lard was conducted by the home economics division of Kansas State College. The tests consisted of frying potato chips in leaf lard, hydrogenated lard and oil. Leaf lard gave the best results, hydrogenated lard next best, and oils the poorest, it was reported.

Discusses New Pea Sizes

Canners of peas are reminded by J. P. Kraemer, chairman of the committee on the simplification of pea sizes, that the pending recommendation for simplification is important. He points out that the system of regrading peas into three instead of five sizes (FOOD INDUSTRIES, April, p. 154) has been needed for a long time and that conditions favor the proposal now as never before.

Canned pea production, he points out, is at the lowest point since the War. The price spread between sizes and qualities is almost at a vanishing point. Both conditions simplify the change-over of sizes.

Mr. Kraemer believes there would be considerable saving in operating costs with the proposed plan, since part of the machinery and overhead could be eliminated. Moreover, the time lost in changing from one size to another would be reduced to half. There would be less chance of mistakes, label inventories would be lowered, and quality would be improved through more rapid change-over from one size to another.

Potatoes With Vitamin A

Potatoes rich in vitamin A will soon be a commercial accomplishment if growing tests now being made by the Department of Agriculture accomplish the expected results. The potato being tested is a hybrid which combines the hardy characteristics of several North American varieties with nutritive qualities of two yellow-fleshed varieties, one a native of Costa Rica and the other of England. Although the flesh of this potato is yellow, it tastes like that of the white potato.

This new potato, U.S.D.A. Seedling 44428, yields heavily, but it will have to undergo rigid trials and cooking tests before it receives final approval. If it proves successful, much is expected of it, since it combines the vitamin content of the yellow-fleshed varieties with the cooking quality, taste, disease-resistance and yield of American white varieties.

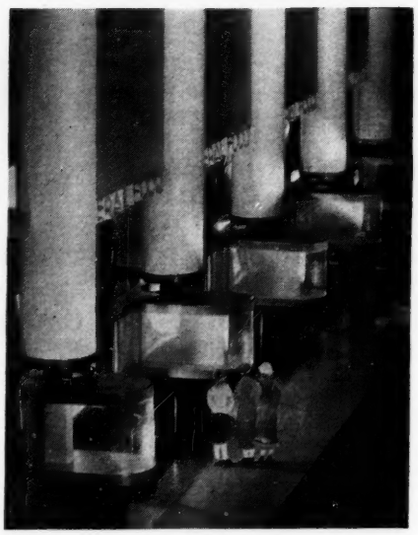
Frozen-Pack Tests Reveal Best Fruit Varieties

Promising new varieties of strawberries and peaches for preserving by the frozen-pack process were revealed in a special exhibit held by the Department of Agriculture recently. And the samples of frozen fruits exhibited gave testimony to the fact that slow rather than rapid freezing proved better for cherries and peaches.

The outstanding new variety of fruit was an unnamed Eastern strawberry seedling, U.S. 660, which was reported to be among the best the frozen-pack workers have ever preserved. Of the commonly grown Eastern strawberries which were frozen, the varieties Big Lake, Big Joe and Fruitland were especially good, but not equal to the seedling 660. Of the commercial varieties, Klondike, Glen Mary and Redheart rank next in quality to the first named. Several other seedlings, Nos. 903, 904, 647 and 722, also were good. A new Pacific Coast strawberry, Corvallis, was outstanding. Other Western strawberries which preserved well are the Redheart and the Marshall, which are the chief ones used for frozen-pack preserving in the West. Several seedlings, Orogon, and Nos. 81, 234, 228, 92 and 7 were all good.

Among the peaches, the outstanding varieties in appearance and flavor included Oriole, Eclipse, Primrose, Brackett, Chairs, J. H. Hale and Late Crawford. The widely grown Elberta ranked beneath the others named.

To determine whether slow or rapid freezing gave the best results, tests were made with strawberries, raspberries, dewberries, cherries and several vegetables. Experiments showed that, in general, there is not much difference in vegetables whether they are frozen rapidly or slowly. This applies also to berries. Specialists found, however, that cherries and peaches are generally better when frozen slowly. They also found, in general, that a fruit, to be successfully frozen packed, must be put up in airtight containers. Of the berries that appeared best with the frozen-pack method were red raspberries and dewberries. The difference between slow and rapidly frozen cherries was especially marked, as the latter discolored badly.



At World's Fair

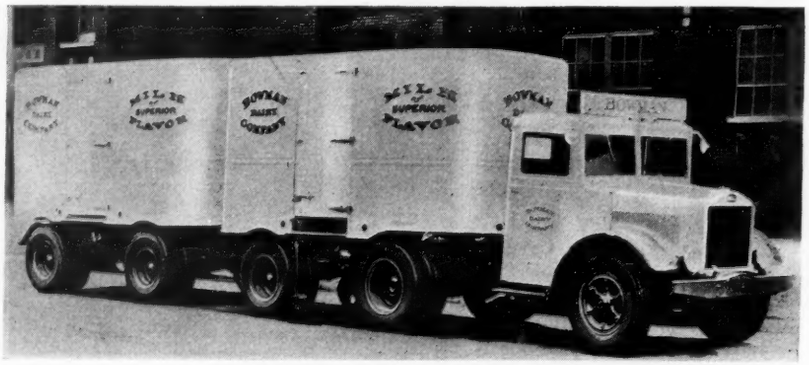
On one of the largest revolving stages ever built, General Foods Corp. will present 16 productions featuring its principal products during the fair at Chicago this summer. Eight shows will be given simultaneously. The spectator may see all 16 without moving.

Fruit Shipped 'Tween Decks

World trade in American citrus fruit may be adversely affected as a result of a new method of shipping. A Department of Commerce trade commissioner at Singapore reports that grapefruit from Palestine has been arriving in the Straits Settlements packed 'tween decks and in "reefer" holds. It has been discovered that the fruit is not only in good condition upon landing but remains in that condition much longer than citrus fruit packed in ice. This discovery may lower the competitive status of American fruit as compared with fruit from both Palestine and Australia.

It is held unlikely that between-deck shipping of citrus fruit would be successful in this country in the hot summer months, but it has been reported that one American fruit shipper plans to utilize that method of packing on shipments of citrus fruit to Far Eastern markets when cool weather arrives.

There is a lower freight rate on the 'tween-deck cargo from the Pacific Coast than from Palestine or Australia.



It Meets State Requirements

Here is one way of meeting weight and length limitations clamped on trucks and trailers by various states. This Fruehauf semi-trailer and trailer arrangement will meet any reasonable highway loading restrictions and will haul a profitable pay-load. Lightweight plymetal and plywood construction is used. Each trailer has a capacity of 306 quart cases of milk.

Dairy Groups Will Meet

Despite the fact that the Dairy and Ice Cream Machinery and Supplies Association has cancelled its 1933 dairy industries exposition, meetings will be held in Chicago this summer by International Association of Ice Cream Manufacturers and International Association of Milk Dealers. The former convention is scheduled for Sept. 18-20 and the latter for Sept. 21-23. The Palmer House will be the headquarters for both meetings.

The associations selected Chicago as a meeting place so that the members would be able to attend the World's Fair, which opens June 1.

Beer Rolls Rolling Stock

Train after train of refrigerator cars such as these are moving out of Milwaukee every day. The return of beer has brought business to many industries, among which are the brewers, car manufacturers and railroads.

Argentina Requires Certificate

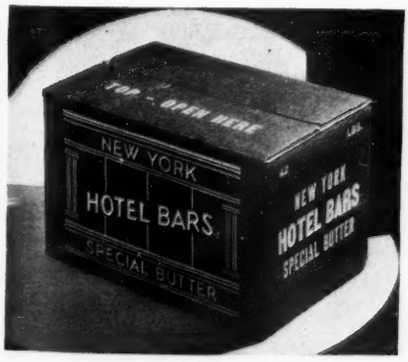
Dried fruits, rice and other plant products can no longer be shipped into Argentina unless they are accompanied by a certificate of sanitation. Certificates issued by competent authority in the country of origin and visaed by an Argentine consul at or near the port of shipment, must accompany all shipments of plants or parts thereof, to prevent the introduction of contagious plant diseases into Argentina.

The certificate must indicate the names of the shipper and consignee, the name and description of the goods, the date and place of certification by the Argentine consul, and a general declaration that the goods are free of contagious diseases.

Tax Trend Favors Bottlers

Bottlers of carbonated beverages are feeling more comfortable. Their despair over the prospects of having their products singled out for special taxation by state legislatures has been alleviated by the trend toward a general sales tax. Nine states have already adopted the sales tax this year with rates graduating from a minimum of ½ per cent to a maximum of 4 per cent.

Despite this favorable trend, the industry finds it necessary to put up a continuous fight against burdensome taxation, for many state legislatures have proposed a tax similar to the one in effect in South Carolina. This is a special tax of 1 cent for each 5 cents of the retail price of bottled carbonated beverages.



It Won the Prize

The finest shipping container in the recent All-American Competition, judged upon appearances, sales value and construction, was that of Frederick F. Lowenfels & Son, New York. The all-over "Myracol" background of the case is of mottled blue and greenish blue.

Bakery Exhibit to Be Held

It appeared that the baking industry would be conspicuous among the World's Fair exhibits by its absence, but Standard Brands, Inc., has come to the rescue. Because of the interest of the Fleischmann's Yeast organization in the baking industry, Standard Brands arranged for a bakery exhibit and has completed negotiations for a space 40x20 ft. in the Hall of Science. Complete details of the exhibit haye not been arranged, but it is known that it will include a motion picture on scientific bread manufacture, samples of the many varieties of bread, charts on the nutritive value of baked goods, and evidence showing the importance of bread in the diet. The background will be a series of elaborate oil paintings showing the evolution of baking.

Analyze Best Pretzel Flour

Grain chemists in the Department of Agriculture have taken some of the guess out of pretzel making. They have found that flours of high protein content have a tendency to produce pretzels of hard and flinty texture; that flours of low protein content cause trouble in the rolling machines and produce a poorer shape and size of product; that clear flours when used alone tend to produce pretzels of poor outside and inside color, of inferior taste and of uncertain keeping quality.

They have learned that "sound flours of both the straight and patent grades, containing from 8 to 10.5 per cent of protein and not over 0.50 per cent ash, such as those milled from soft red winter wheat, are satisfactory for pretzel making"; that a "satisfactory pretzel flour can be made by blending hard-wheat flours and soft-wheat flours of high and low protein content or by using a patent or straight flour with a small percentage of clear."

The grain chemists report that, as nearly as can be ascertained, the qualities most desired in the hard type of pretzels are a rich, pleasing flavor, smooth, glossy yellow-brown outside appearance as opposed to a rough, streaked, pale yellow or a scorched appearance; a white inside appearance as opposed to a caramelized or scorched condition; and a crisp texture which makes mastication easy.

Concentrates

Four times as much vitamin C is contained in Hungarian paprika as in an orange or lemon, according to Dr. Albert Szentgyoergyi, Szegedin University, Budapest. . . . Brewers have shown a preference for bearded barley, but the barbless type will make beer equally as tasty, University of Wisconsin authorities state. . . . The Bureau of Fisheries will transplant 2,000 Chinook salmon from Columbia River to Deep Creek Lake, Maryland, whence they are expected to find their way to the Atlantic and back again at spawning time via the Potomac River. . . . The New Jersey Legislature has been investigating the "super market" situation with a view to adopting any legislation found necessary. . . . Chain stores that manufacture food products for their trade are at a disadvantage during depression periods, the Federal Trade Commission's report, "Chain Store Manufacturing," shows. . . . The constitutionality of Ohio's bread weight law which places the minimum weight of a loaf at 16 oz. has been upheld by the federal court at Columbus. . . . A bill proposing a tax of 6 cents per pound on uncolored and 10 cents on colored oleomargarine and raising the manufacturers' tax from $600 to $1,000 and the wholesalers' tax from $480 to $500 has been introduced in the House. . . . A study of advertising budgets of national manufacturers is being conducted by Association of National Advertisers, Inc. . . . Consumer opinion expressed at a Department of Agriculture hearing on apple butter, April 6, indicated the product should be made from fresh fruit. Members of the trade opposed the use of dextrose in apple butter. . . . At a hearing on April 7 representatives of the dried-fruit trade opposed standards for those products. . . . The French import quota for fresh apples and pears combined from the United States for the second quarter of 1933 has been fixed at 2,710 metric tons, according to the Department of Commerce.

MEN, JOBS AND COMPANIES

INDUSTRY

ALLIED MILLS, INC., Chicago, will erect a modern soya bean plant at Norfolk, Va. Construction will begin immediately and be completed by September. The plant will be equipped to process, store and export soya beans, and soya flour will be one of its products. The crushing plant will have a capacity of 600,000 bu. per year. There will also be a 300,000-bu. elevator. Allied Mills believes the potentialities of the soya bean industry of the United States have only been scratched. As to exports, it points out that Hamburg alone offers an annual market for over 37,000,000 bu. of soya beans.

BOOTH FISHERIES CO., which went into voluntary bankruptcy Oct. 15, will be put into business again on a sound financial basis if a plan agreed to by the organization committee goes into effect. The plan provides that the company be taken over by a new corporation and that shares of the new company be issued to fund obligations in excess of $8,747,000.

BORDEN Co's label was used on ice cream in the New York market for the first time on April 15 when it was applied to the ice cream manufactured by Anheuser-Busch and Dairy Made. The change-over is being followed by an intensive advertising campaign. Borden will endeavor to boost the quality of the product, and every store selling it will be required to meet a definite standard of sanitation.

CITRUS JUICE & FLAVOR CO., LTD., has opened a new main office and plant at Orange, Calif., in the heart of the fruit district, and has closed its Los Angeles office. The plant occupies about 20,000 sq. ft., and the juicing machine has a capacity of 2 tons of fruit per hour. Howard R. McBride is president of the company and Howard J. Succop is vice-president in charge of production.

COCA-COLA Co. plans to spend more than $5,000,000 in advertising during 1933 to hold its place as a ranking beverage against legal beer. This company's sales amounted to 27,799,000 gal. in 1930, falling off slightly during subsequent years.

LOUIS P. COLGAN'S whole-grain corn canning plant at New Park, Pa., one of the largest in the tri-state section, has been purchased by George L. Smith, of Fallston, Md. Mr. Smith is re-equipping the plant to operate under the Tuc-Douthitt theory of operation.

DONALDSON BAKING CO., operating plants in Louisville, Ky., and Canton, Ohio, has purchased the Dunkle Sons Bakery, Columbus, Ohio, and will establish headquarters in that city. The Dunkle bakery specializes in house-to-house business, operating a fleet of 24 trucks. Its name will be changed to Donaldson Baking Co.

GENERAL BAKING CO., New York, lost the decision in a suit for injunction and damages against Grocers Baking Co., Louisville, Ky. The defendant was charged with infringement of the trademark "Sunshine Vitamin D" and with unfair competition. The U. S. District Court of Western Kentucky held the trademark to be a descriptive term not applicable to any one product. The court also held that the Grocers Baking Co. did not copy the wrapper design used by General Baking.

HERSHEY CHOCOLATE CO., Hershey, Pa., is installing new air-conditioning equipment in its plant. It recently received a carload of heating and cooling units from La Crosse, Wis.

F. L. KLEIN NOODLE CO., Chicago, has experienced an expansion of business during the last two years that has necessitated its building a second story to its plant. This work was completed during April at a total cost of $75,000. This company also makes potato chips and pretzels. It is installing a new automatic machine for making pretzels that will double its capacity for that product.

GOTTFRIED KRUEGER BREWERY CO., Newark, N. J., was forced by striking laborers to shut down its plant completely the day after beer became legal. It opened again on April 12, hiring a new crew to replace the union men who had walked out after a wage dispute.

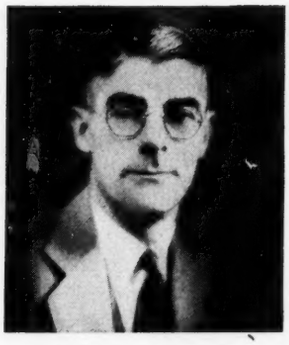
LIBBY, MCNEILL & LIBBY, Chicago, reports that its volume of sales during the last fiscal year was only a little below that of 1929. However, the selling price of its products has declined about 40 per cent since 1929.

LOFT, INC., Long Island City, N. Y., has given up plans for establishing its $200,000 candy plant at Detroit. Loft entered the Detroit market last fall, distributing through 60 Cunningham-Economical drug stores. Soon afterward, plans for the Detroit plant were announced. Now, however, the Detroit market will be supplied from the Long Island City plant.

PACIFIC AMERICAN FISHERIES, Bellingham, Wash., will operate its Bellingham cannery, declared to be the largest in the world, at full capacity this summer in anticipation of a big run of sockeye salmon, according to A. W. Deming, vice-president. The company will operate eleven salmon traps on Puget Sound, and will expend about $100,000 for trap equipment and cannery supplies.

JACOB RUPPERT, INC., New York, has enjoyed such a demand for the famous Knickerbocker and Ruppiner beer that steps have been taken to increase tremendously the brewery's fermenting and storage facilities. The company has just placed an order for 15 glass-lined tanks with a 1,913-bbl. capacity each and for two tanks of 1,383 bbl., representing a total of 31,461 bbl.

SHOTT BREWING CO., Highland, Ill., has decided to use steel casks for beer, recently placing an order for 500 chromium-alloy steel barrels. R. Guy Kneedler, president, states that the brewery will soon distribute beer at the rate of 400 bbl. per day.



HARRY S. ELDRED
Now general manager for Armour.

JOHN F. TROMMER, INC., Brooklyn, N. Y., famous brewing concern, has purchased the old Orange Brewing Co. plant at Newark, N. J., and plans to spend several hundred thousand dollars to renovate the brewery and double its capacity, formerly 100,000 bbl.

PERSONNEL

FRANK T. BELL has been appointed Commissioner of Fisheries under the new régime to succeed Henry O'Malley. Mr. Bell has never been connected with any commercial fisheries business, a fact which, it is explained at Washington, will permit him to enter his new office with an unbiased mind.

CHARLES F. BLISS, vice-president and secretary of National Biscuit Co., New York, has accepted the chairmanship of the food division of the Trade and Industry Committee of the Salvation Army United Appeal, and he is organizing the food field for participation in the fund-raising campaign now under way.

W. TRESPER CLARKE, formerly with Fine Products Corp., Atlanta, Ga., entered the employ of Rockwood & Co., Brooklyn, N. Y., on April 1, as a chemist in the plant control laboratory.

J. C. COX, formerly vice-president and treasurer of William Wrigley, Jr., Co., has been made first vice-president of the company. J. A. GILL was elected treasurer.

PAUL B. DUNBAR, assistant chief of the Food and Drug Administration, is believed by observers at Washington to be slated for promotion to the position vacated by Walter G. Campbell as head of the Food and Drug Administration. This opinion is based upon the fact that Dr. Dunbar is working under R. G. Tugwell on the proposed revision of the Food and Drug act.

HARRY S. ELDRED was appointed general manager of plants of Armour & Co. on April 5. Mr. Eldred has been assisting vice-president H. G. Mills in the management of the Armour plants for several years. He began his career in the packing industry in 1917 with Morris & Co. When Morris merged with Armour in 1923, he moved to the general office in Chicago and in 1925 became general auditor. Five years later, he became assistant to the vice-president in charge of plant operations.

H. C. SHERMAN
Honored by Institute of Chemists.

R. H. GIFFORD was recently appointed manager of the branch house sales department of Swift & Co., Chicago, to succeed M. G. Middaugh, who retired April 1 after more than 37 years of service. Mr. Gifford has been with the company more than 30 years, starting in Boston, going to Chicago in 1909, and being transferred to the branch house sales department in 1928.

J. HOERTH, formerly manager of J. B. Blood Co., Lynn, Mass., is now president and general manager of Bauer Baking Co., Inc., Cincinnati, which has four general retail bakeries.

H. A. LEIGH has resigned as manager of Brackman-Ker Milling Co., Ltd., at its branch in Victoria, B. C. Mr. Leigh had been with the company for 32 years, and he left on account of ill health. He is one of the best known grain men in the western province. ROBERT JESSE, city sales manager at Victoria for sixteen years, succeeds Mr. Leigh.

DALE MCMULLEN, president of Allied Mills, Chicago, was recently chosen president of Central Sugar Co., Decatur, Ind. Other officers include THOMAS SNYDER, formerly executive of the Snyder molasses organization, vice-president; H. C. OSKEN, plant superintendent; and WARD CALLAND, field supervisor.

DUDLEY H. MUDGE, formerly representative of J. Walter Thompson Co., has been appointed advertising manager of Libby, McNeil & Libby. He will direct Libby advertising activities throughout the world. Mr. Mudge handled the Libby account with J. Walter Thompson, and it was under his direction that some of the company's well-known campaigns were developed.

H. W. RODEN, formerly in charge of sales and advertising for Harold H. Clapp, Inc., Rochester, N. Y., was recently appointed president and general manager of the company. This company manufactures strained vegetables, being a subsidiary of Johnson & Johnson.

OSCAR A. SAAR, of American Molasses Co., New York, N. Y., succeeds E. L. Powell as president of National Syrup and Molasses Association. Mr. Powell resigned the presidency March 31 after he sold his syrup and molasses business to Penick & Ford. L. B. WHITFIELD, SR., of Alabama-Georgia Syrup Co., Montgomery, Ala., has been elected vice-president of the association to succeed Mr. Saar.

H. C. SHERMAN, head of the department of chemistry at Columbia University, has been awarded the medal of the American Institute of Chemists, presented annually for outstanding service to chemistry in America. The award was made in recognition of Dr. Sherman's food researches and of his services to the profession through the training of chemists. Dr. Sherman's work on foods includes studies on the effect of diet on longevity, the value of minerals in foods, the action of enzymes and the effect of vitamins.

J. W. SHUMATE, assistant general superintendent of California Packing Corp., San Francisco, recently returned from Australia, where he spent the peak season in development work to improve a mechanical peach pitter. His work has resulted in the adoption of a vibrating knife to replace the old type shearing knife. This improvement is reported to improve the appearance of the finished product.

ALFRED UIHLEIN was recently elected chairman of the board of Joseph Schlitz Brewing Co., Milwaukee. ERWIN C. UIHLEIN was elected president of the company. ROBERT A. UIHLEIN became vice-president and secretary; JOSEPH E. UIHLEIN, EDGAR J. UIHLEIN, GEORGE UIHLEIN and S. E. ABRAMS, vice-presidents.

DEATHS

CLIFTON WOOD BRANSFORD, of Owensboro, Ky., a well-known figure in the flour milling industry of the South, died April 8 at the age of 75. Mr. Bransford was president of Bransford Mills for 34 years, 1887 to 1921. He served as president of American Millers' Association in 1919-20. Mr. Bransford was well known in activities outside the food industry as a banker, wagon manufacturer, newspaper editor and politician.

FREDERICK W. FRAZIER, formerly associated in the baking business with his father, Frederick H. Frazier, chairman of the board of General Baking Co., and former manager of Wigly Candy Co., Inc., Brooklyn, N. Y., died April 24 after a short illness. He was 31.

SECONDO GUASTI, president of Italian Vineyard Co., died April 6, at Santa Barbara, Calif., at the age of 42. Mr. Guasti also was president of Fruit Industries, Inc., and he was the head of Guasti-Giuli, Inc., a tire concern in Los Angeles.

THEODORE P. LOBLAW, president of Loblaw Groceterias Co., Ltd., died April 2 at Toronto. The Loblaw Groceterias have stores throughout Ontario and 50 in New York State.

CHANDLER R. MOODY, 73-year-old president of Moody & Thomas Milling Co., Cleveland, died April 13 after an extended illness. Mr. Moody had been president of the company for 53 years. For several years he was one of the few millers in his section of the country who still used water power. The Moody & Thomas Co. has been operating a mill at Shelby, Ohio, and has offices in Akron and Cleveland.

ROBERT J. PEACOCK, a Maine canner who had been connected with the industry practically his entire life, died recently. Mr. Peacock was formerly on the board of directors of National Canners' Association. He was always active in his support of efforts to improve the canning industry.

WILLIAM WATERMAN, 43-year-old vice-president and active head of J. S. Waterman & Co., Inc., and first vice-president of National Federated Flour Clubs, died in New Orleans recently. Mr. Waterman joined his father, J. S. Waterman, Sr., in the flour and grain business in 1904. He built up an export business for the company, traveling in Central America and the West Indies. Later his business expanded to include European territory. He was a leader in the trade. He established *The Mixer*, sectional trade journal devoted to baking, was active in the formation of Louisiana Bakers' Association, and was one of the founders of the New Orleans Flour Club.

ASSOCIATED INDUSTRIES

AUTOSTEAM PROCESS CO.'s patent on the Schmelzer rendering process was held to be valid and to be infringed by Allbright-Nell Co. by Federal Judge George E. Q. Johnson, Chicago. According to Paul Willer Petersen, president of Autosteam Co., the action began when Allbright-Nell caused an "interference" to be declared by the Patent Office between the Schmelzer patents and one of A-N's Laab's applications. The decision was appealed and the high Patents Tribunal gave Autosteam two of the three disputed claims. Allbright-Nell sued in federal court to obtain possession of these claims, and Autosteam countered by charging infringement and claiming damages. The judge dismissed A-N's charge and upheld the counter claim of Autosteam.

FRANK W. ARMSTRONG, for more than 20 years manager of American Can Co.'s adjustment department, died March 30 at Roselle Park, N. J. Mr. Armstrong would have celebrated his 63d birthday had he lived two days longer. He became connected with American Can Co. in 1901.

GENERAL AMERICAN TANK CAR CORP., New York, reports that eight famous brewers have signed contracts for a steady supply of refrigerator cars. General American operates some 20,000 refrigerator cars on a leasing basis, and is prepared to put 2,000 of these cars into beer service at once.

FIRST MACHINERY CORP., New York, announces that Mike Firstenberg, formerly assistant football coach at New York University, has been placed in charge of the company's new machinery division. He is at the New York office.

PATTERSON FOUNDRY & MACHINE CO., East Liverpool, Ohio, recently appointed R. C. Denny chief engineer of the stoker division. Mr. Denny spent more than 15 years in stoker and furnace work with Combustion Engineering Corp., New York, and M. H. Dietrich Co., Chicago.

PROCTER & GAMBLE, Cincinnati, has developed a new plastic vegetable oil shortening. Known as "Sweetex," the new shortening will be packed in bulk and will supplement "Primex," announced Jan. 7 by P&G. Sweetex is especially recommended by P&G for high-ratio cake formulas.

VISUAL DISPLAY, INC., manufacturer of displays for food products, has moved its factory and offices from Chicago to Le Seur, Minn., F. S. Wayne, vice-president, announces.

BUSINESS TRENDS

Prospects for Canned Peas, Snap Beans and Corn

Should the downward trend in canned-pea consumption continue to the end of the current season, only 10,000,000 cases of canned peas need be packed this year to meet domestic requirements, according to the Department of Agriculture. To produce this quantity, only slightly more than 60 per cent of last year's planted acreage, or about 125,000 acres, will be required, if growing conditions are average. Based on present trends, the apparent consumption for 1932-33 is estimated at between 11,500,000 and 12,000,000 cases.

The forecast for snap beans is that a 1933 pack about the size of the one last year will hold supplies close to consumption requirements. An acreage of 30,000, which is equal to that harvested last year, will produce a pack of 4,000,000 cases under average conditions. It is estimated that 30,070 acres will be planted.

As to prospects for canned corn, the Department of Agriculture estimates the apparent 1932-33 consumption at 12,000,000 cases. A pack of 9,000,000 cases added to the carry-over would meet the requirements, allowing for a nominal carry-over. An acreage of 160,000 to 170,000 would suffice for the needed pack. These estimates are based on continued low consumption. The apparent consumption from Aug. 1, 1932, to March 1, 1933, was 20 per cent below last year.

BASIS FOR THE CURVES

Retail food prices, factory employment, factory payrolls and wholesale prices are based on indexes of the Department of Labor. Cost-of-living index is that of the National Industrial Conference Board. Electrical power consumption figures are furnished by *Electrical World*.

Prices Up; Unsettled

• Anticipating an administration inflationary program, speculative interests have been advancing commodity prices, especially grain and food, since about April 1. The trend has been more pronounced since April 19; but, as we go to press, profit taking and rains in the Middle West are causing marked recessions. An abundance of supplies, except, perhaps, in malting grains, and lack of buying power will check soaring prices.

• Average wholesale price of all commodities as reported by U. S. Department of Labor shows no change in the active five-week period ending April 22. Farm products and foods advanced 2.77 and 2.55 per cent respectively during the same period. The *Journal of Commerce* weighted index of prices gives increases of 6.67 per cent for all commodities, 29.11 per cent for grains, and 8.18 per cent for foods during the five weeks ending April 29.

• Business indicators point to improved conditions and renewed activities in spite of the number of banks remaining closed. *The Business Week* Index of general business activity has risen from the low of 47.2 per cent of normal for the week ending March 18 to 53.5 per cent for the week ending April 22.

• A. & P. tonnage sales for March increased 21.92 per cent over those for February, 1933, but fell 4.82 per cent below March, 1932.

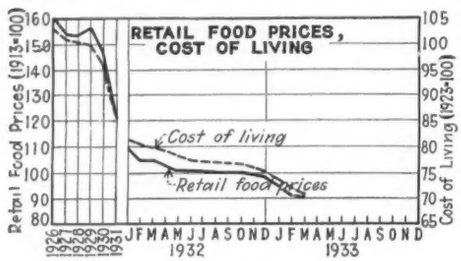
Public Makes Run on Beer, Cheese and Pretzels

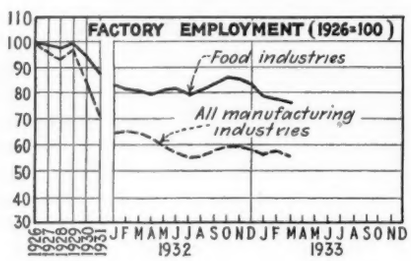
Brewers no longer fear the thirteen-year-old hard-liquor habit of the American public. The great demand evidenced for the 3.2 beer since April 7 has proved that the people like beer, even though some of them never tasted real beer before. In fact, so many people have been drinking so much beer that the breweries and wholesale houses are far behind. A large New York wholesaler, R. C. Williams & Co., was 10,000 cases oversold on April 18. That this demand will continue unabated is not expected, but the consensus of the trade is that sales will hold up well.

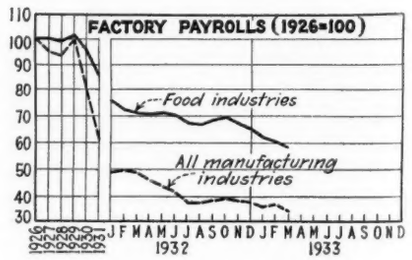
Pretzel and cheese manufacturers and bakers of rye bread have profited as well as the brewers. Pretzel sales have increased by 100 per cent, as nearly as can be determined, and many bakers are expanding production facilities for that product. The consumption of cheese has increased tremendously also, and the delay necessitated for aging has caused some manufacturers to fall behind the demand. The Borden Co., New York, reported an increase in cheese sales of from 25 to 100 per cent, with supplies of Liederkranz exhausted two weeks after beer became legal. Charles & Co., large New York retail store, sold twice as much cheese per day after April 7, and it did a similar business in pretzels.

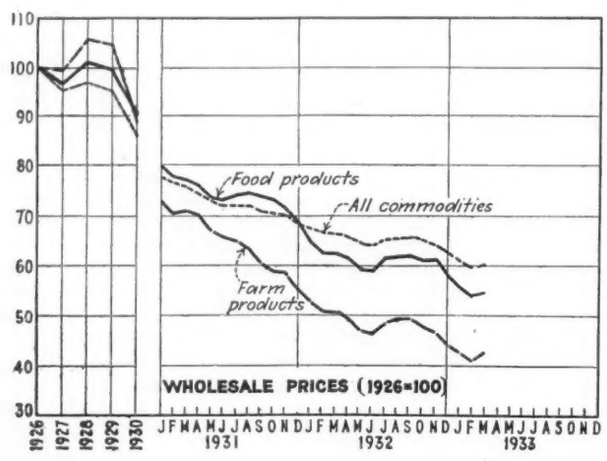
The sale of sandwiches with beer definitely increased the consumption of rye bread, and some bakeries reported more business in white bread, also. There was likewise a larger demand for crackers, particularly cheese crackers.

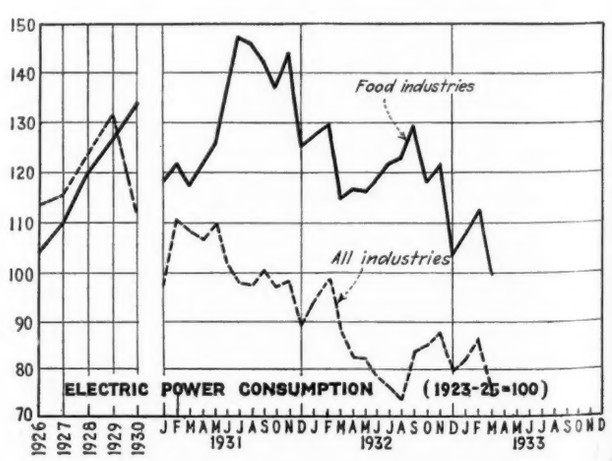
Meat packers had not noticed much effect from the sale of beer at the time











this was written, but they expected substantial rises in the market for cured sausage products and pickled pork.

Contrary to predictions that certain foods would be adversely affected by the sale of beer, there was almost no indication of such a trend at the close of April. Milk, pastries and confections seemed to maintain a normal volume. Of course, restaurants sold fewer glasses of milk and not so many cups of coffee and tea, but apparently not enough less to show any appreciable effect on total sales.

What is perhaps the most promising aspect of the sale of beer is that sales of food in general have been stimulated. Some estimates place the rise at 10 per cent, although it is still too early to do any more than guess at the figure.

Trend Toward Private Labels Has About Run Course

Voluntary chains handle about 30 per cent of the grocery business of the United States, and 40.2 per cent of these organizations promote extensive private label lines. These are facts presented by the American Institute of Food Distribution in its survey, "The Voluntary Chains—An Adjustment in Relationship and Methods."

This report states that 22½ per cent of the chains carry limited stocks of private label goods and that of the 413 voluntary chain groups questioned, only 16.2 per cent do not market goods under their own label. The remaining 21.1 per cent could not be classified.

The survey indicates that the trend toward private labels has about run its course, and that little change in the situation will take place in the next few years. In respect to the super-markets, the report states that the bargain markets are a product of a depression and are, in general, of small importance to the food business of tomorrow.

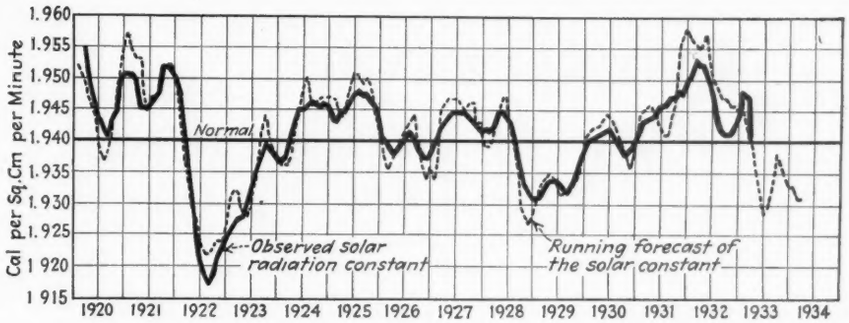
Classification of the reports sent in to the institute show that coffee and canned vegetables are the most popular private-label goods, 71.2 per cent of the voluntary chains retailing private brands of coffee and 43.6 per cent selling canned vegetables of their own brand.

Sees New Orleans as Center Of Packing Industry

New Orleans will become one of the big packing centers of the nation within the next few years, in the opinion of M. G. Middaugh, retiring executive of Swift & Co. He believes that Louisiana is destined to become one of the greatest cattle-producing areas in the world. New Orleans may also become the center of a major canning industry. An exhaustive study of all factors involved in such a development is now being made by the Industrial Bureau of the New Orleans Association of Commerce.

Another step being taken by the Bureau is a survey of the sugar industry with a view to bringing it back to its former importance. Sugar-cane acreage in Louisiana dropped from 310,000 in 1911 to 128,000 in 1926, due to the inroads of sugar-cane diseases. With the introduction of new varieties of cane, acreage increased to 179,000 in 1932.

A notable trend in Southern agriculture is farming on a "live-at-home" basis. Unless inflation prices raise the optimism of the Southern farmer, he probably will arrange his crops so as to fortify his larder and granaries against the cold days of next winter. The agricultural experts are advising him to grow his own foods and feedstuffs.



Solar Radiation Takes Expected Drop; Unseasonable Weather in Farming States

The anticipated decline in solar radiation occurred in the month of March, and the observed monthly mean for that month, 1.940 cal. per square centimeter per minute, is exactly on the forecast line which was calculated many months ago. Another equally deep decline is expected to occur in April and May.

To visualize the importance of this decline it should be understood that the energy received by the earth from the sun via the route of solar radiation is about 10,000 times more powerful than all the energy which man can control. Thus the half per cent drop in March is 50 times as great as all the energy at the command of man throughout the world. April and May are calculated to experience similar declines.

New England and most northern states are experiencing unseasonable weather, which is delaying agriculture and retarding sales of spring and summer goods.

Normal radiation is 1.940 calories per square centimeter per minute. The following are the monthly means for the past eight months.

Aug.,	1932	1.944	Dec.,	1932	1.945
Sept.,	1932	1.937	Jan.,	1933	1.948
Oct.,	1932	1.940	Feb.,	1933	1.947
Nov.,	1932	1.940	March,	1933	1.940

Indicators

EVAPORATED milk consumption increased 4.3 per cent last year, as compared with 1931, and was 41.8 per cent above the 1923-25 average. And this despite a decline of 3.5 per cent in all dairy products and of 4.4 per cent in all food manufactures, as compared with 1931.

FAMILY food bills were 44 per cent lower in February, 1933, than in September, 1929, and more than 13 per cent below February, last year. These figures are based on average A. & P. prices. Outstanding declines in food items since 1929, in per cent, include: navy beans, 80; eggs, 61; butter, 56; flour, 52; pork and beef, more than 50.

WINTER wheat production for this year will be the lowest since 1904, if the forecast of 334,000,000 bu. made by the Department of Agriculture proves correct. This would mean a decrease of 128,000,000 bu. However, world surpluses will go up slightly, according to the International Institute of Agriculture at Rome.

LARGE commercial acreages of lettuce, carrots, beets, radishes and turnips have been greatly reduced this year in the Sacramento Valley, according to Wm. A. Ward Seed Co., Inc. The acreage of peas throughout California is equal to or larger than normal.

OLEOMARGARINE production is holding up. The output of uncolored oleomargarine in February this year totaled 17,071,153 lb., as compared with 16,862,520 lb. in 1932.

BUTTER equal to or better than the imported product and at a lower price is guaranteed by a new factory near Maracaibo, Venezuela. The plant will also produce cheese. A new chocolate factory in Pietermaritzburg, South Africa, will materially reduce importations, which in normal years averaged around 2,000,000 lb., according to the American vice consul at Durban.

THE corn crop in Iowa probably will yield less this year than normal. Entomologists report that it is white grub year in the great corn state.

LESS salmon was canned last year throughout the world than in either of the three preceding years. The Bureau of Fisheries reports that the pack in 1932 amounted to 8,484,011 standard cases of 48 1-lb. cans, while 9,018,121 standard cases were packed in 1931; 10,438,645 cases in 1930; and 10,046,162 cases in 1929. The Pacific Coast pack dropped 51 per cent.

DOMESTIC exports of dried fruits declined last year, totaling 420,340,000 lb., valued at $19,503,000, as compared with 502,942,000 lb., valued at $28,934,000, in 1931, according to the Department of Commerce. Prunes ranked first among the dried fruits exported.

ABSTRACTS OF CURRENT LITERATURE

OBSERVATIONS ON CHANGES IN RASPBERRIES AFTER PICKING. Theodore Rendle. *Analyst*, Vol. *58*, p. 69.

The ripening of raspberries is more rapid than that of most fruits, and the changes occurring after picking are very rapid. A comparatively large quantity of volatile organic material, which is not due to microoganisms, accompanies the ripening process. The pectic substances are subject to rapid change with destruction of jelling power; this change was shown to be arrested by heating. These rapid changes are possibly due to enzyme activity.

* * *

DO COCOA BEANS CONTAIN LECITHIN? F. E. Nottbohm and F. Mayer. *Zeitscrift für Untersuchung der Lebensmittel 65*, pp. 55-66; January, 1933.

In this investigation of the lecithin content of cocoa beans, the authors have worked out a method of determining the cholin from that compound, instead of the organic phosphoric acid, as in previous methods. The cholin content of eleven samples of cocoa beans and four commerial cocoas was from 0.102 to 0.149 per cent of the fat-free, dry material, corresponding to 0.679 to 0.991 per cent lecithin. This lecithin is not present as free lecithin, however, as the ether extract of the beans showed no lecithin at all. Hot alcoholic extraction splits the lecithin compounds and removes about 50 per cent of the total cholin. This extract, however, has a phosphoric-acid content which indicates that other phosphoric bodies richer in phosphorus are present besides lecithin. The 50 per cent of cholin which cannot be extracted by hot alcohol must be present as some other sort of cholin compound.

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DETERMINATION OF DRY SUBSTANCE IN TOMATO PULP. Karl Taxner. *Zeitschrift für Untersuchung der Lebensmittel 65*, pp. 220-224; February, 1933.

Most buying and selling of tomato pulp is done on the basis of dry-substance determination, which is no easy or rapid matter. The author uses the adapted Rosenberg method, which gives duplicate results to 0.1 per cent. The pulp is mixed with washed ignited quartz sand in a glass vessel and dried for 5 hours on a water bath. Need for a rapid control method led him to investigate the recent Zeiss tomato refractometer, which is equipped with two scales, one for under 16 per cent and one for over 16 per cent dry substance. This refractometer is used by merely straining a few spoonfuls of pulp through a medium-weave cloth and taking the reading of the strained liquor with the tomato refractometer. The author found excellent agreement with the longer drying method, usually to within 0.1 to 0.4 per cent. The refractometer method is recommended for its simplicity and rapidity for control work in manufacture.

TESTING THE QUALITY OF FLOUR BY THE RECORDING DOUGH MIXER. C. O. Swanson and E. B. Working. *Cereal Chemistry*, Vol. 10, pp. 1-29; January, 1933.

A number of photographs and charts, as well as a detailed description of the apparatus, are presented. Though a limited amount of work has been done, the instrument appears to be very valuable for fruitful investigation.

* * *

ABSORPTION OF CALCIUM FROM THE CASEIN OF MILK. K. Ballowitz. *Biochemische Zeitschrift*, Vol. 256, pp. 64-74; Dec. 7, 1932.

Cooking causes considerable absorption of the calcium of milk by the casein and appreciably changes the pH of the milk. If the calculated quantity of absorbed calcium is added to milk in the form of calcium chloride, normal coagulation occurs. This explains the discrepancy often encountered in laboratory determinations.

* * *

EFFECT OF CARBON DIOXIDE ON THE COLOR CHANGES OR BLOOM OF LEAN MEAT. J. Brooks. *Chemistry and Industry*, Vol. 52, pp. 17T-19T; Jan. 27, 1933.

The rate of oxidation of hemoglobin in muscle is not affected to a significant extent by concentrations of carbon dioxide below 20 per cent. Hence, if other conditions of storage are the same, the color changes of lean meat in air and in air containing 20 per cent carbon dioxide should be the same.

* * *

VITAMIN B_4. H. Barnes, J. R. P. O'Brien and V. Reader. *Biochemical Journal*, Vol. 26, pp. 2035-2040; 1932.

Alcoholic extracts of yeast contain two heat- and alkali-labile factors necessary for nutrition; one is vitamin B_1 (the anti-neuritic vitamin) and vitamin B_4. By use of activated charcoal a white crystalline material of high vitamin B_4 activity and apparently constant chemical composition has been prepared. Essential steps in the preparation are fractional precipitation with phosphotungstate and removal of a pentose group from the molecule by acid-hydrolysis. Further work is required to prove this product is identical with vitamin B_4.

* * *

CAROTENE AS A NATURAL ANTI-OXIDANT. R. C. Newton. *Oil and Soap*, Vol. 9, pp. 247-252; 1932.

Carotenoid pigments or some substance associated with them in nature act as anti-oxidants in some fats. Such anti-oxidant properties are carried over into the finished bakery products, such as pie crust and crackers. The maximum stabilizing action is accomplished only when the pigment is mixed with the entire body of oil before hydrogenation treatment.

COFFEE AND CHICORY. C. I. Kruisheer. *Chemisch Weekblad*, Vol. 30, pp. 154-66; Feb. 18, 1933.

Chicory root contains inulin, which is relatively unstable and begins to break down into simpler carbohydrates even under the mild conditions of the commercial drying of the root. When chicory is roasted, for use as a coffee substitute or adulterant, the decomposition of inulin to simpler sugars goes even further, the products including levulosin, fructose derivatives and glucose derivatives as well as hydroxymethylfurfuraldehyde. It is characteristic of roasted inulin materials that the fructose sugars exceed the quantity of glucose sugars, the ratio being about 4 to 1. Since coffee does not contain inulin, it was considered probable that a practical test for detecting chicory in adulterated coffee, and for analysis of coffee substitutes, could be worked out on the basis of this difference from chicory. Practical tests for the purpose were indeed successfully developed; and in the course of the investigation a study also was made of the nature of caramelization of sugars. This investigation revealed that the "isosucrosan" of Pictet is not a chemical individual but is a mixture of carbohydrate products, probably including levulosin and glucosin. The effect of alkali on caramelization was studied.

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THE INFLUENCE OF CARBON DIOXIDE ON THE RATE OF MULTIPLICATION OF BACTERIA. R. B. Haines. *Chemistry and Industry*, Vol. 52, pp. 13T-17T; Jan. 27, 1933.

Carbon dioxide in concentrations of 10 and 20 per cent at 20, 4 and 0 deg. C. has but little action on proteins, but increases the lag period and lengthens the generation time by about one-half of Pseudomonas and Achromobacter at 20 deg. C. Change in pH caused by the carbon dioxide does not account for the retardation of growth.

* * *

TRICALCIUM PHOSPHATE AS A CAKING INHIBITOR IN SALT AND SUGAR. H. V. Moss and others. *Industrial and Engineering Chemistry*, Vol. 25, pp. 142-147; February, 1933. FOOD INDUSTRIES, Vol. 5, p. 133; April, 1933.

Tricalcium phosphate has been found to prevent caking in salt and sugar better than other commonly used fillers. The efficiency of tricalcium phosphate as a cake inhibitor is dependent upon four major variables in chemical and physical composition: ratio of CaO to P_2O_5, iron and aluminum phosphate content, degree of hydration, and particle size.

* * *

NATURE OF THE SUBSTANCE CAUSING STAPHYLOCOCCUS FOOD POISONING. E. O. Jordan and W. Burrows. *Proceedings of the Society for Experimental Biology and Medicine*, Vol. 30, pp. 448-449; January, 1933.

Investigation shows the following: the active principle will not distill; it is not readily dialyzable; it is markedly unstable to N/100 NaOH; it is unstable to heat in N/100 HCl solution. Other characteristics and experimental details are given.

PATENT DIGEST

Baking and Milling

High-Protein Hard-Wheat Flour Adjusted to Protein Content of Soft Flour by Addition of Gelatinized Starch for Production of Pastry Dough — Ralph M. Bohn, Evanston, Ill. No. 1,900,094. March 7, 1933.

Bread Subjected to Vacuum Preparatory for Wrapping—Wilhelm Muller, one-third to Automatic Bread Wrapping Co., Ltd., and one-third to Francis Hawkins, Sydney, Australia. No. 1,901,115. March 14, 1933.

Beverages

Low-Alcohol-Content Beverage Obtained Through Control of Fermentation by Addition of Cranberry Juice—Adolf Lewinson, Berlin-Charlottenburg, Germany. No. 1,899,512. Feb. 28, 1933.

Coffee Roasted by Downwardly Directed Heat While Passing Through Roaster in a Vibrating One-Bean Layer on a Flat Surface—Joseph F. Quinn, Burlingame, Calif., to George W. Caswell Co., San Francisco, Calif. No. 1,900,072. March 7, 1933.

Dairy and Egg Products

Dried Milk Added to Liquid Egg Yolk, Thoroughly Mixed and Subsequently Dried to Produce a Milk-Egg Yolk Product Which May Be Beaten Up—Samuel Tranin to Tranin Egg Products Co., Kansas City, Mo. No. 1,897,775. Feb. 14, 1933.

Finely Ground Hard or Soft Cheese Treated by Addition of Sodium Meta-Phosphate and Melting at Temperatures Below 100 Deg. C. to Give a Crustless Cheese Product—Chris Draisbach to Chemische Fabrik Joh. A. Bentkiser G.m.b.H., Ludwigshafen-on-the-Rhine, Germany. No. 1,897,892. Feb. 14, 1933.

Fermented Milk Beverage Prepared by Yeast Action on Sterilized Fermentable Carbohydrate and Milk in Closed Container for 18 Hours at 37½ Deg. C.—John A. Moran, New York, N. Y. No. 1,898,885. Feb. 21, 1933.

Cultured Milk Product Containing Living Streptococcus Lactis and Bacillus Acidophilus in Therapeutically Effective Quantities—Morse E. Matt to Abbotts Dairies, Inc., Philadelphia, Pa. No. 1,899,817. Feb. 28, 1933.

Raw Egg Emulsified With a Preserving Quantity of Sugar and Freed From Occluded Air by Centrifugal Action—Herman Heuser, Evanston, Ill. No. 1,900,444. March 7, 1933.

Milk Sterilized Electrically by Being Projected in a Stream Against a Surface Which Serves as an Electrode — L. A. Lauder, Greenville, Ill., to Pet Milk Co., St. Louis, Mo. No. 1,900,509. March 7, 1933.

Milk Cooled and Held in Low-Capacity Self-Contained Units—George E. Wallis, Evanston, Ill., to Creamery Package Manufacturing Co., Chicago, Ill. No. 1,901,014. March 14, 1933.

An Ice Cream Confection Bar Containing Granular Edible Cereal Constituents—Bert R. J. Hassel, Rockford, Ill. No. 1,901,394. March 14, 1933.

Fruits and Vegetables

Fruit Prepared for Market by Submersion in Aqueous Preserving Solution and Subsequent Treatment With Coating Consisting of Carbon Tetrachloride and Paraffin—Rex De Ore McDill, Riverside, Calif., to Food Machinery Corp., San Jose, Calif. No. 1,900,295. March 7, 1933.

Vegetables Dehydrated in Closed Compartment Under Partial Vacuum and With Continuous Recirculation of Moisture-Laden Air Within Compartment — William H. Bozarth to Osborn Products, Inc., Vineland, N. J. No. 1,900,974. March 14, 1933.

Miscellaneous Products and Processes

Liquid Jelly-Forming Composition Consisting of an Organic Acid, a Flavoring, a Pectin Concentrate in Solution and Non-hydrolyzable Mineral Salt—Frank M. Boyles, Brooklyn, N. Y. No. 1,898,336. Feb. 21, 1933.

Live-Yeast and Lactic-Acid-Containing Supplemental Food in Dry Form Prepared From Milled Cereals Rich in Gluten—Thomas G. Dyer to Standard Products Co., Des Moines, Iowa. No. 1,898,350. Feb. 21, 1933.

Rancidity in Unsaturated Fats, Oils and Fatty Acids Retarded by Addition of Unsaturated Polybasic Aliphatic Acids — George R Greenbank, Washington, D. C., to Free Use of Government and People of the United States. No. 1,898,363. Feb. 21, 1933.

Grains of Various Kinds Malted in a Single Unit Tank so as to Prevent Souring and Sliming of Grain During Process—Reinhold E. Kusserow, Oakland, Calif. No. 1,899,160. Feb. 28, 1933.

Blood-Free Dried Meat Prepared From Finely Minced Raw Meat Which Has Been Soaked in Water Between 59 and 80 Deg. F., Drained and Subsequently Soaked in Water Between 130 and 150 Deg. F.—William John Abbott, Toorak, Victoria, Australia, to International Products Proprietary, Ltd., Melbourne, Victoria, Australia. No. 1,899,224. Feb. 28, 1933.

Measured Quantities of Salt Mechanically Added to Cans in a Moving Production Line—Damon Marcel Hume, Redkey, Ind. No. 1,899,619. Feb. 28, 1933.

A Sweetened and Flavored Dessert Powder Made With Rennin and Containing Calcium Glycerophosphate — Karl J. Monrad, Little Falls, N. Y. No. 1,902,415. March 21, 1933.

Starch and Sugar

Sugar Extracted From Juices by Concentration in Presence of Non-Saponifying Oil Having a Boiling Point Higher Than the Boiling Point of the Sugar Juice Until Coagulation and Crystallization Permit Separation From the Oil — Adam Meiro, Brussels, Belgium. No. 1,899,287. Feb. 28, 1933.

Gelatinized Starch Produced by Spraying a Cold-Water Starch Suspension Into a Stream of Heated Air — Werner Maier, Baden-Baden, Germany, to American Lurgi Corp., New York, N. Y. No. 1,901,109. March 14, 1933.

Copies of Patents

Complete specifications of any United States patent may be obtained by remitting 10c. to the Commissioner of Patents, Washington, D. C.

Photostatic copies of foreign patents may be obtained at the same address, prices being forwarded on application.

Copies of patents should be ordered by number, as titles used in this digest seldom correspond with title of patent.

THE GOVERNMENT PUBLISHES

DOCUMENTS ARE AVAILABLE *at prices indicated from Superintendent of Documents, Government Printing Office, Washington, D. C. Send cash or money order; stamps and personal checks not accepted. When no price is indicated, pamphlet is free and should be ordered from bureau responsible for its issue.*

Marketing Eggs. By Rob R. Slocum. Department of Agriculture, Farmers' Bulletin No. 1378; 5 cents.

Federal Specifications. New or revised specifications of the Federal Specifications Board on: Apples, canned, Z-A-611a; prunes, canned, Z-P-671a; sausage, cervelat-style, PP-S-74; scrapple, PP-S-141. The above specifications are available from the Bureau of Supplies and Accounts, Navy Department.

Depreciated Exchange. Tariff Commission Report No. 44, Second Series. Discusses effect on imports, exports and ad valorem equivalents of specific rates of duty.

Annual Report of the United States Tariff Commission, 1932. Tariff Commission unnumbered pamphlet; 15 cents.

Commerce Yearbook, 1932, Vol. II — Foreign Countries. Bureau of Foreign and Domestic Commerce; $1.25. Elaborates statistical summary of world trade of foreign countries, and other economic technical information. Vol. I, previously issued, relates to the United States.

Distribution of Sales of Manufacturing Plants, 1929. Bureau of the Census, Distribution No. IG-202; 15 cents.

Manufacturing Market Statistics. By Chas. B. Eliot. Bureau of Foreign and Domestic Commerce, Domestic Commerce Series No. 67; $1.

Summary of Wholesale Distribution for the United States. Bureau of Census, Distribution No. W-151; 20 cents.

Summary of Retail Distribution for the United States. Bureau of the Census; 20 cents.

Dried Beans and Black-Eye Cowpeas. U. S. Tariff Commission Report No. 61, Second Series; 10 cents.

A Study of the Pollution and Natural Purification of the Upper Mississippi River. By H. R. Crohurst. Public Health Service Bulletin No. 203; 10 cents.

Crab Meat. U. S. Tariff Commission Report No. 57, Second Series; 5 cents.

Barley Malt. U. S. Tariff Commission Report No. 59, Second Series; 5 cents.

Distribution of Livestock. Census of Distribution, Agricultural Commodity Series, Distribution No. A-204.

Aids to Retail Grocery Profits. Bureau of Foreign and Domestic Commerce, Domestic Series No. 71; 10 cents. Practical hints designed to help make more money for the grocery retailer, based on the Louisville Grocery Survey.

Propagation and Distribution of Food Fishes, 1932. By Glen C. Leach. Bureau of Fisheries, Appendix IV to Report of Commissioner of Fisheries for the Fiscal Year 1932; 5 cents.

Federal Specifications. New or revised specifications of the Federal Specifications Board on: Ice cream, EE-I-116; sauces, chili and Worcestershire, EE-S-71a; sweetbreads, thymus glands, PP-S-871. The above specifications are available from the Bureau of Supplies and Accounts, Navy Department.

The Baking Industry. Foodstuffs Division, Bureau of Foreign and Domestic Commerce, mimeographed; 10 cents. Contains general information and statistics and selected references to published material.

Sperm Oil and Spermaceti Wax. U. S. Tariff Commission Report to the President of the United States; mimeographed.

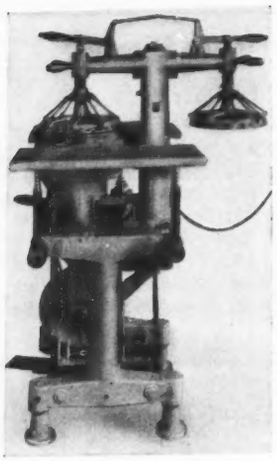
An Aid for Analyzing the Market for General Consumer Goods in New England. Bureau of Foreign and Domestic Commerce, Domestic Regional Division; 5 cents.

An Aid for Analyzing the Market for General Consumer Goods in the Pacific Southwest. Bureau of Foreign and Domestic Commerce, Domestic Regional Division; 5 cents.

Meeting the Small-Order Problem in the Confectionery Industry. By S. L. Kedzierski and Charles E. Hughes. Bureau of Foreign and Domestic Commerce, mimeographed; 10 cents.

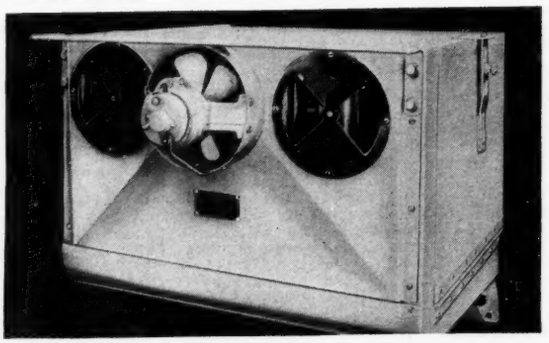
Short Weighing and Over Weighing in Chain and Independent Grocery Stores. Report of the Federal Trade Commission in response to Senate Resolution No. 224, Senate Document 153, 72d Congress, 2d Session; 5 cents.

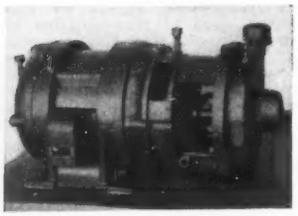
NEW EQUIPMENT FOR



Pie Wrapper

Pies may be wrapped at the rate of 600 an hour with the Hesson pie-wrapping machine marketed by John M. Hart Co., Inc., Graybar Bldg., New York, N. Y. With standard attachments the wrapper handles one size of pie, but with extra equipment it will accommodate any size from 6 to 10 in. Only one operator is required. The transparent wrapper which the machine places over the pie and seals in place is held to keep the pie fresh at least 24 hours longer than when the pie is not sealed. The wrapper is sealed to the underside of the pie-plate rim by an adhesive.



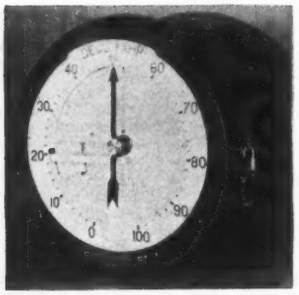


High-Head Pumps

Three new two-bearing pumping units of the low-capacity, high-head type have been developed by Allis-Chalmers Mfg. Co., Milwaukee, Wis. These pumps will work against heads up to 100 lb. (231 ft.) and above, and they cover a range in capacity from 30 to 140 gal. per minute.

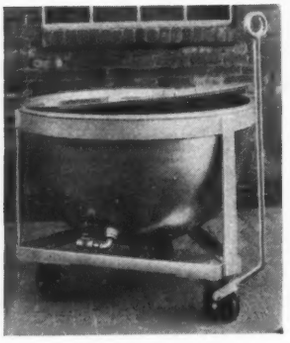
Coffee Granulator

Functions of two types of grinding mills are embodied in the all-purpose coffee granulator recently placed on the market by Jabez Burns & Sons, Inc., 11th Ave. and 43d St., New York, N. Y. The machine produces a full range of commercial grinds, including that ordinarily done by the "steel-cut" machines and by those for very fine grinds. This is made possible by departures in design. A special disk-type breaker-and-cracker effects two reductions with one set of parts. The cracked coffee then flows over a perforated chute which bypasses fine granules direct to the mixer. Trash is scalped off the cracked product before it reaches the granulating rolls. The granulated coffee passes from the rolls into a mixer incorporating features of the company's Normalizer and Compactor. Adjustment for different grinds is made in a few seconds. The machine is driven by a 5-hp. motor; it is 69x78x38 in.



Indicating Recorder

Low-cost, dependability and convenience are attributed to the round-chart Micromax indicating recorder of Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa. The instrument is adapted to recording temperature, smoke density, liquid levels, SO_2, CO_2, speed, pressure, solar radiation and other applications. The recorder has a boldly lettered circular scale and a 24-hour circular chart with straight-line time coordinates. It is made as a single-point instrument only, and can be equipped with signal or control contacts. The mechanism is mounted on a frame hinged to the case to make it accessible. The case is 16¼ in. in diameter.

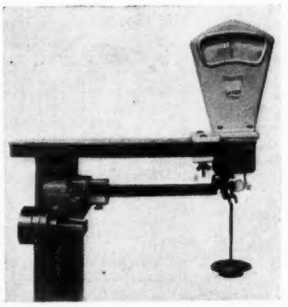


Portable Kettles

Steam-jacketed kettles mounted on trucks so that they may be moved from place to place have been developed by Aluminum Cooking Utensil Co., New Kensington, Pa. The portable kettle is used to transfer products to filling machines or as a container for mixing ingredients to be transferred to stationary kettles. With a hose connection, the kettle may function in "finishing" a job entirely or in raising an ingredient to suitable temperature for transfer to a production line. The portable kettles have been made in 50-, 100- and 200-gal. units.

Dial Indicator For Platform Scales

Guesswork and erratic weighing with platform scales are removed by an overweight-underweight indicator developed by Jacobs Brothers Co., Inc., Washington and Water Sts., Brooklyn, N. Y. This indicator is an attachment that rests on the frame of the scale and is mechanically connected to the end of the weighing beam or to the stem of the hanging poise. Motion of the beam and its position on either side of the exact position of balance are indicated by a pointer operated through a simple lever system and damped by an air dashpot.

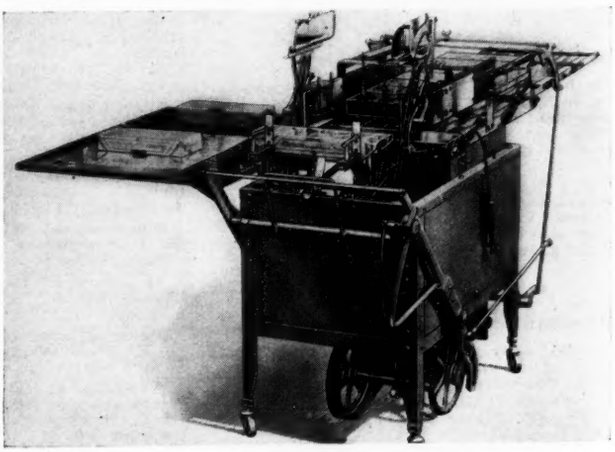


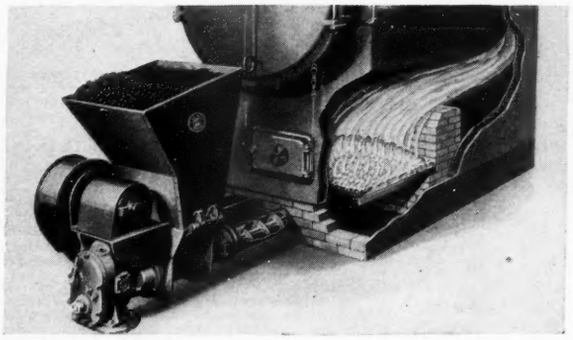
Forced-Draft Cooler Uses Water Ice

A modern means of refrigerating trucks with ice has been developed by Fitz Gibbon & Crisp, Inc., Trenton, N. J., in the form of the Icefin cooler. The latest model of the Icefin is equipped with a small electric fan which creates a forced draft to give the unit greater capacity than the non-mechanical type. This enables it to cool a larger truck body and to maintain lower temperatures. The unit also is equipped with ventilators for natural air circulation. The fan, driven from the battery, draws about 3 amp. of current. Ice is placed in the cooler in full-sized cakes, and water is led off by a drain. The cooler is no larger than an egg crate and no heavier than the truck driver.

Semi-Automatic Adjustable Wrapper

Cartons varying in length from 5 to 17 in. may be wrapped in transparent cellulose at the rate of 600 per hour in the semi-automatic wrapping machine marketed by Valdor Sales, Inc., 330 Frelinghuysen Ave., Newark, N. J. This machine handles packages varying in width from 3¾ to 8 in. and in height from 1¾ to 6 in. Adjustments for the different sizes are made within a few minutes. In operation, the wrapping is placed around the package, then the package is turned end-over-end as it is set in the machine over vertical fingers which complete the bottom fold. The machine is then tripped, and operation is automatic from that point. Electric hot plates effect the seal.





Compact Stoker With Direct Fan Drive

There is but little wear on the V-belt drive of the new stoker announced by Link-Belt Co., 910 South Michigan Ave., Chicago, Ill. The driving motor is directly connected to the forced-draft fan, thus driving its heavy load directly. The light load, the screw conveyor, is the only element driven by the belt. Another advantage lies in a motor-base design which enables the unit to be closely coupled, allowing it to fit into a small space. The chrome steel feed screw is driven through a variable-speed transmission, and the stoker has automatic electric control for operating it at predetermined boiler pressure. The unit is available for boilers with capacities of from 10 to 250 boiler horsepower.

THE MANUFACTURERS OFFER

Filling Machines—Powder-filling equipment manufactured by F. J. Stokes Machine Co., Tabor Road, Olney P. O., Philadelphia, Pa., comprises the subject of an 8-page folder. A 16-page folder covers tube and jar fillers.

Stoneware—The jars, tanks, stills and mixers made by U. S. Stoneware Co., Akron, Ohio, for syrup, beverages, acids, extracts and other food products and chemicals are described in an 8-page bulletin, No. 402.

Electric Baking—Actual wattage consumption and cost data are given in the chapter on baking in a 64-page illustrated booklet, "Cooking and Baking by Electricity," by Westinghouse Electric & Manufacturing Co., Mansfield, Ohio.

Food Choppers—In its 30-page catalog, No. 19, John E. Smith's Sons Co., 50 Broadway, Buffalo, N. Y., describes and illustrates its machines for chopping food, slicing bread, cutting potato chips and grinding meat. A separate leaflet is devoted to the new "Buffalo" chopper.

Speedalcometer—An instrument for rapid determination of alcoholic content of cereal beverages is described in a 4-page bulletin by R. Juerst, 122 West King St., Hillside, N. J. With the Speedalcometer, which is an attachment for Juerst's Ebulliometer, alcoholic content can be determined almost at a glance.

Syrup Industry—A 64-page, pocket-size booklet listing members of the syrup and molasses industry has been prepared by National Syrup and Molasses Association, Kansas City, Mo.

Safety Contests—The practices of a number of industrial organizations in connection with accident prevention are presented in a report entitled "Methods of Organizing and Conducting Industrial Safety Contests," published by Metropolitan Life Insurance Co., One Madison Ave., New York, N. Y.

Turbines and Heaters—Steam turbines for mechanical drives are the subject matter of a well-illustrated, 16-page booklet by General Electric Co., Schenectady, N. Y. Another booklet of 36 pages describes, illustrates and gives specifications for G.E. electric heating units. Two leaflets are devoted to inclosed squirrel-cage motors and to low-speed alternating-current generators, respectively.

Auto-Service Lathes—More than 80 photographs of shop set-ups for different automotive repair jobs requiring machining or grinding give considerable instructive value to a 12-page booklet by South Bend Lathe Works, 426 East Madison St., South Bend, Ind.

Monel Metal—Eight pages of text, tables and charts in Bulletin T-5, by International Nickel Co., Inc., 67 Wall St., New York, N. Y., give the engineering properties of Monel Metal.

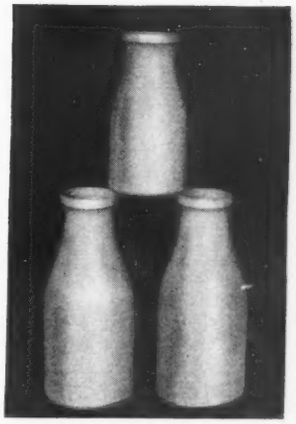
Malt Mills—Milling equipment for malt houses and allied industries is the subject matter of an 8-page, well illustrated booklet by Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

Belt Drives—Information of considerable practical value is being published in a series of 50 weekly reports entitled "Mechanical Power Transmission from Motor Drive to Industry," sold on subscription by American Leather Belting Association, 41 Park Row, New York, N. Y. The power-transmission problem is considered from the standpoint of design, maintenance and costs within a wide range of applications and for different types of transmission.

Stainless Steel—The composition, properties and uses of stainless steels are discussed in a 20-page, attractively illustrated booklet by Electro Metallurgical Co., 30 East 42d St., New York, N. Y. One section is devoted to the food industries.

Molded Cellulose Containers

Bottles, containers and tubs, molded in one piece from cellulose, without joints, have been developed at Mellon Institute of Industrial Research on a fellowship by F. N. Burt Co., Ltd., Buffalo, N. Y. After being formed, the containers are impregnated through their entire wall thickness with "Opax," a tasteless and odorless waxlike material. The containers are unbreakable, will not soften and may be handled in the ordinary filling and capping equipment. They are opaque and can be supplied in any solid color. They are one-third better heat insulators than glass. In the case of milk bottles, the pouring edge can be crimped over to protect it.

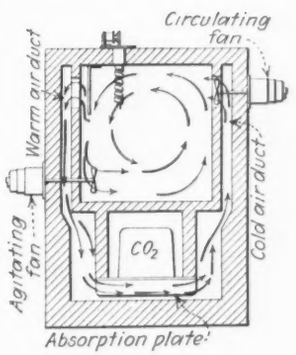


High-Lift Truck

Among the latest innovations in the power truck field is a high-lift, swinging-boom-crane truck developed by Yale & Towne Manufacturing Co., Philadelphia, Pa. The boom on this truck is mounted on large-diameter rollers and may be swung by hand 45 deg. from center in either direction. The height of the boom may be varied between 33 in. and 102 in., depending on the over-all truck height, without changing the boom outreach. The crane has a capacity of 1,200 lb. in any position.

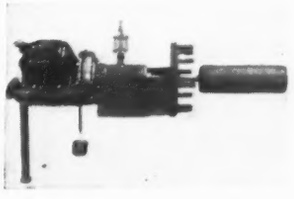
Controls Temperature Of Truck Bodies

Perishable products can be carried over long distances at any desired temperature with a system of refrigeration control for truck bodies developed by Mack Trucks, Inc., 34th St. and Anable Ave., Long Island City, N. Y. With this system, known as the Statotherm, a refrigerant—usually solid CO_2—is located at the bottom of the truck body, where it does not interfere with loading space. The body is of double-wall construction and a circulating fan, operating intermittently, lifts the cold air from the space around the heat-absorption plate to the food compartment, replacing the warm air. A second fan at the bottom of the compartment agitates the air to provide uniform temperature. The circulating fan is controlled by a thermostat which may be adjusted for different temperatures and which keeps the load temperature practically constant. The fan motors are operated off the 12-volt storage battery and will function for about 48 hours on a fully charged battery.



Controls Viscosity Automatically

Viscosity can be automatically controlled in tomato catsup, condensed milk, chocolate and other such products by a device manufactured by Thyle Machinery Co., 514 Bryant St., San Francisco, Calif. This control consists essentially of a cylindrical resistor immersed in the viscous product and rotated, through speed reduction gears, by a ½-hp. motor. The motor and reduction gear assembly are mounted on a flange which terminates in a sleeve that is supported by two ball bearings, permitting it to rotate. The center of gravity of the motor is above the center line of the shaft, which results in the motor's being overbalanced. A weight which may be varied compensates for the overbalancing and holds the motor in a vertical position. However, when the viscosity reaches such a point that the driving torque overcomes the effect of the counterbalance, the motor and its base rotate through a small arc. This movement operates a mercury switch on the base and the switch operates a signal or automatic control apparatus. This regulator will control the viscosity of tomato catsup within a variation of 10 seconds.



CONSTRUCTION NEWS

	Proposed Construction Pending	Contracts Awarded — April	Contracts Awarded — Cumulative 1933 — No. Awards	Contracts Awarded — Cumulative 1933 — Total
Bakery Products	.....	.....	10	$128,000
Beverage	$11,168,000	$489,000	14	987,000
Canning and Preserving	.....	.....	5	143,000
Confectionery	60,000	.....	..	.....
Grain Mill Products	353,000	65,000	8	484,000
Ice, Manufactured	148,000	.....	5	256,000
Meats and Meat Products	.....	.....	3	108,000
Milk Products	225,000	180,000	15	509,000
Sugar	68,000	.....	..	.....
Miscellaneous	631,000	40,000	7	328,000
Total	$12,653,000	774,000	67	$2,943,000

PROPOSED WORK BIDS ASKED

Bottling Plant—Greensburg Brewing Co., F. A. Maddas, Dir., 201 North 1st St., Jeannette, Pa., will take bids in May for construction of a bottling plant, Alwine Ave., Greensburg, Pa. R. J. Brocker, 201 Coulter Bldg., Greensburg, is architect.

Bottling Plant — National Fruit Products, Woodward Bldg., Wash., D. C., having plans prepared for the altering of tire manufacturing plant into bottling and shipping plant, at Orangeville, Md. Estimated cost $50,000.

Brewery—American Brewing Co., 730 Bienville St., New Orleans, La., having plans prepared for the construction of brewery extension. Estimated cost $150,000. S. Stone, Jr., Masonic Bldg., New Orleans, is architect.

Brewery — Arizona Brewing Co., H. Lenkowitz, Representative, 1st Natl. Bank Bldg., Phoenix, Ariz., plans brewing plant. Estimated cost $250,000.

Brewery—Bavarian Brewing Co., 12th and Pike Sts., Covington, Ky., having plans prepared for construction of a brewery, at 12th and Pike Sts., Covington, Ky. $150,000. L. S. Deglow, Electric Bldg., Cincinnati, O., is architect.

Brewery — Don Carlos Brewing Co., Los Angeles, Calif., having preliminary plans prepared for the construction of 6 buildings, west part of Los Angeles. Estimated cost $500,000. Bryant & Shaw, 1610 Cosmo St., Los Angeles, are architects.

Brewery—French Creek Brewing Co., Meadville, Pa., plans modernizing brewery and constructing additions at Meadville, Pa. Estimated cost is $250,000.

Brewery—Hauser Brewing Co., 11th St. and Santa Fe Ave., Los Angeles, Calif., having preliminary plans prepared by C. Beelman, 1019 Union Bank Bldg., Los Angeles, Calif., Archt., for brewery, 11th St. and Santa Fe Ave., Los Angeles, Calif. Estimated cost is $400,000.

Brewery—Hop Farmers Affiliated and Oregon Brewers, c/o J. E. Edmonston, pres., 1003 American Bank Bldg., Portland, Ore. New company formed, for the construction of brewery. Architect not appointed. Estimated cost $350,000.

Brewery—C. J. Kupper, engr., 409 East Main St., Bound Brook, N. J., taking competitive sketches for brewery, North Main and Knopf Sts., Manville, N. J., for Great Eastern Brewery, Inc., Wilhonsky Bldg., Main St. and Champlain Rd., Manville. Estimated cost is $1,000,000. Architect not appointed.

Brewery—New Amsterdam Brewing Co., 10 East 40th St., New York, plans brewery, Baltimore, Md. Estimated cost is $1,000,000 or more. Maturity indefinite.

Brewery—New Amsterdam Brewing Co., 10 East 40th St., New York, having sketches prepared by Badgeley & Wood, 101 Park Ave., New York, Archts., and c/o Owners, for brewery at Washington, D. C. Estimated cost is $2,500,000.

Brewery—C. Proebstle, c/o City Ice Co., 105 Missouri Ave., Atlantic City, N. J., having preliminary plans prepared for the construction of brewery and ice plant, North Missouri Ave. Estimated cost $40,000. Schwarz Laboratories, Inc., 202 East 44th St., New York, is engineer and architect.

Brewery—J. Ruppert, 1639 Third Ave., New York City, takes bids about June 15, for 1st unit, storage building, brewery. E. Jacques Kahn, 2 Park Ave., New York, Archt. Estimated cost is $3,500,000.

Brewery—Philip Zang & Associates, 815 Gaylord St., Denver, Colo., having plans prepared by G. White, Archt., 615 Columbine St., for brewery, 7th and Water Sts., Denver, Colo. Estimated cost is $1,000,000.

Confectionery Plant—Sifers Candy Co., Iola, Kansas, plans rebuilding confectionery plant, Iola, Kan. Estimated cost is $60,000 or more. Engineer and architect not appointed. Maturity indefinite.

Ice Cream Plant — Noaker Ice Cream Mfg. Co., 1100 East Tuscarawas St., Canton, O., plans altering and constructing plant additions. Estimated cost is $28,500.

Milk Plant — Pet Milk Co., Coldwater, O., will build milk plant addition. Estimated cost $28,000 with equipment.

Dairy—Jersey Farm Dairy and Benham Ice Cream Co., D. Carlson, Mgr., 1420 H St., Fresno, Calif., having plans prepared for dairy. Estimated cost $100,000 with equipment.

Dairy—Producers Milk Co., E. A. Thomas, manager, 4560 West 35th St., Cleveland, O., having plans prepared for the construction of dairy building. Estimated cost $40,000. W. J. Wefel, 3327 Yorkshire Rd., is architect.

Dairy Plant — Jerome Toddy, Two Rivers, Wis., plans construction of a dairy plant, 24th and Hays Sts., Two Rivers, Wis. Estimated about $28,000 with equipment.

Fat and Tallow Works — V. R. Starling, Perry, Ia., having plans prepared for rebuilding fat and tallow plant. Estimated cost $28,000 with equipment.

Grain Elevator—East Side Iron Elevator Co., Second National Bank Bldg., Toledo, O., plans to construct grain elevator, Miami St., Toledo, O. Estimated cost is $250,000.

Grain Mill—Valdosta Feed Mills, Inc., Lee St., Valdosta, Ga., having plans prepared for the construction of feed and grain mill, at Lee St. Estimated cost $25,000 with equipment.

Granary—Scott Bros. Grain Co., Fort Worth, Tex., is having plans prepared for rebuilding granary to replace fire loss, 400 West Biddleston St. Estimated cost $25,000.

Grist Mill—Wark Bros., Wyoming, Ont., having plans prepared for the construction of grain elevator to replace fire loss. Estimated cost $25,000. Owners want prices on equipment.

Potato Starch Plant — G. E. Full & Son, Charlottetown, P. E. I., plans increasing capacity of plant for manufacture of potato starch.

Stock Yards—Mississippi Valley Stockyards Co., W. C. Veach, Vice Pres., 4070 North 1st St., St. Louis, Mo., having plans prepared for the construction of hog houses and sheep pens to enlarge stock yard capacity. Estimated cost $25,000.

Coffee Equipment—Golden Bear Coffee Co., Ltd., 611 South Academy St., Los Angeles, Calif., has leased building and plans installing equipment at Phoenix, Ariz. $50,000. R. B. Julian, Phoenix, vice pres.

Soy Bean Plant—Allied Mills, Inc., 141 West Jackson Blvd., Chicago, Ill., having plans prepared for construction of plant to be used for processing, storing and exporting soy beans at River Front, Norfolk, Va. Estimated cost is $500,000.

Ice Plant—Brooklyn Retail Butchers Corp., 641 Atlantic Ave., Brooklyn, N. Y., will receive bids after June 15, for ice plant, South Elliot Pl. and Atlantic Ave. M. Smith, 627 Hudson St., New York, is architect.

Ice Plant A—General Air Ice Corp., 14 Merritt Bldg., Los Angeles, Calif., having plans prepared for the construction of dry ice manufacturing plant. Estimated cost $85,000. Southwestern Engineer Corp., 4800 Santa Fe Ave., Los Angeles, is engineer, and will install machinery and equipment. Owners propose to establish plants in Oakland, Calif., and Seattle, Wash., or Portland, Ore.

Ice Manufacturing Plant — J. Hannon, 3 Meadow St., Winsted, Conn., plans ice manufacturing plant, Highland Lake Section, Winsted, Conn. Estimated cost is $35,000. Private plans.

Beet Sugar Refinery Alterations — Amalgamated Sugar Co., Steel Bldg., Denver, Colo., plans altering beet sugar refinery at Burley, Idaho. Estimated cost is $40,000.

Beet Sugar Refinery—Michigan Sugar Co., Owosso, Mich., having plans prepared for reconditioning beet sugar refinery. Estimated cost $28,000 with equipment.

CONTRACTS AWARDED

Bottling Plant—Falstaff Brewing Corp., 3684 Forest Park Blvd., and A. Beffa, 1240 North Jefferson Ave., St. Louis, Mo., awarded contract for the construction of bottling plant for brewery, 3644-52 Forest Park Blvd., to J. S. Aberici, 1818 Boatmen's Bank Bldg. Estimated cost $105,000.

Bottling Plant, etc.—North America Brewers Co., Greene and Wilson Aves., Brooklyn, N. Y., awarded contract for bottling plant and storage, Greene and Wilson Aves., Brooklyn, N. Y., to Caye Constr. Co., 356 Fulton St., Brooklyn, N. Y. Estimated cost is $30,000 or more. Allmendinger & Schlendorf, Brooklyn, N. Y., Architects.

Remodeling Brewery—Fresno Brewery, D. H. Swan, Hollingsworth Bldg., Los Angeles, Calif., awarded contract for remodeling brewery at 100 M St., Fresno, Calif., to Fisher & McNulty, 507 Martel Bldg., Fresno, Calif. Estimated cost is $75,000. C. Butner, Cory Bldg., Fresno, Calif., is architect.

Brewery — Eastern Beverage Co., H. L. Murphy, Hammonton, N. J., will alter packing plant into brewery, Railroad Ave. and 13th St. by separate contracts. Estimated cost $28,500.

Brewery — Humboldt Brewery Co., H. C. Howe, Pres., Russ Bldg., San Francisco, Calif., awarded contract for reconstructing brewery and installing equipment, at Boadway, Eureka, Calif., to Mercer-Fraser Co., Eureka. Estimated cost $150,000.

Brewery — Old New England Brewing Co., Derby Ave., Derby, Conn., awarded contract for the construction of brewing and bottling plant, to C. Smith & Sons, 101 Water St. Estimated cost $100,000.

Creamery—Consolidated Badger Co-Operative Co., Shawano, Wis., awarded contract for the construction of creamery building, 120x40 and 35x36 ft., to F. Lemke, Clintonville.

Dairy Plant — County Dairy Co., Clayton, Mo., will construct dairy plant, near Ladue Rd. and Coleman Ave. on sub-contract basis, at Clayton, Mo. Estimated at $60,000 with equipment. Robert Francis Denny, Clayton, Mo., is architect.

Creamery—Mistletoe Creameries, Austin St., San Antonio, Tex., awarded contract for construction of new creamery plant, San Antonio, Tex., to Key Constr. Co., 928 North Flores St., San Antonio, Tex., $64,397.

Cheese and Dairy Plant—Pure Milk Products Co., I. B. Pierce, Secy., Monticello, Wis., awarded contracts for the construction of cheese and dairy plant to Karlen & Heinman Co., Monticello.

Milling Plant — Mount Vernon Milling Co., Mount Vernon, Ind., awarded contract for the construction of mill to Long & Smith, 762 Lincoln Ave., Evansville. Estimated cost $40,000.

Grain Elevator—G. Wolf, North Liberty, Ind., will build grain elevator by day labor. Estimated cost $25,000.

Canned Goods Warehouse—Freemont Canning Co., Freemont, awarded contract for the construction of 100x170 ft. canned goods warehouse to Owen-Ames-Kimball Co., Grand Rapids. Estimated cost $40,000.